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# THE MENTALITY OF THE CRIMINAL WOMAN

Educational Psychology Monographs

Edited by Guy Montrose Whipple

No. 14

# The Mentality of the Criminal Woman

A Comparative Study of the Criminal Woman, The Working Girl, and The Efficient Working Woman in a Series of Mental and Physical Tests

BY

JEAN WEIDENSALL, PH.D.

Formerly Director of the Department of Psychology, Laboratory of Social Hygiene, Bedford Hills, New York

BALTIMORE, U. S. A.

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# EDITOR'S PREFACE

The earlier criminologists, led by Lombroso, developed the idea of a criminal type. The "born criminal" was supposed to be characterized by a typical and unmistakable physiognomy, and much was said and written of the criminal nose, the criminal ear, and the like. The later developments of criminology showed that Lombroso and his followers had been carried away by the enthusiasm of the pioneer and had fallen victims to the fallacies of hasty generalization. In recent years the analysis of criminality has been directed, and rightly, more definitely upon the mental traits of the criminal; it has become evident that the mind is more significant than the face, that the composition of motives underlying conduct is more significant than the contour of the mouth, that the presence of feeble-mindedness is more significant than the presence of feeble bodily constitution. It is but natural, then, that the rapid development of mental tests should include their application to criminals of various types with the idea of discovering empirically in what ways their responses to these tests might differ characteristically from the responses of normal, law-abiding citizens.

In the present monograph Dr. Jean Weidensall publishes the results of an extensive investigation in which the responses of a group of women at the Bedford Hills, New York, Reformatory are compared, step by step, with the responses to the same mental tests previously gathered by Dr. Helen T. Woolley and Mrs. Charlotte R. Fischer in the Bureau of Vocational Guidance connected with the public schools in Cincinnati, Ohio.

The results are of prime importance both to workers with mental tests and to practical penologists who seek to individualize punishment in such a manner as to meet the needs of the offender as well as the needs of the offense. G. M. W.

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## AUTHOR'S PREFACE

The preface to this monograph can only begin with grateful acknowledgment to Dr. Helen Thompson Woolley, Director of the Bureau of Vocational Guidance of Cincinnati, whose most generous coöperation made possible the use of her tests and data at the Laboratory of Social Hygiene before they had appeared in published form. The extent of our indebtness to Dr. Woolley the pages of the volume itself make explicit. I would also express my appreciation to Charlotte Rust Fischer, for her kindness in giving us the method of administering and scoring the Woolley tests. My sincere thanks are extended to Mary Augusta Clark for drawing the curves of the third chapter and for the larger part of the numerical work entailed by the tables therein. I wish to make special acknowledgment to my mother, without whose constant aid, in the compilation of tables and in other ways less easy to set down in words, this book could not have been written. Especially am I indebted to Dr. Katharine Bement Davis for the history of the Laboratory, as it follows, from its inception to the present.

J. W.

September, 1916.

# INTRODUCTION

In publishing the first of a series of studies made at the Laboratory of Social Hygiene, it may not be amiss to present as a preface a brief account of the history and purpose of the Laboratory.

The New York State Reformatory for Women at Bedford Hills opened in May, 1901. It was established by law to care for women between the ages of sixteen and thirty convicted of felonies, misdemeanors, or petty offenses. These women are sentenced on an indeterminate sentence with a maximum of three years. The law distinctly prescribes that persons committed for felonies shall be first offenders. While no such provision is made for other classes of offenses, the Reformatory was distinctly intended to take care of young women offenders who were of a reformable type and for whom the state could afford to expend the necessary amount for education and industrial training, in the hope of their becoming useful women.

It very soon became apparent, however, that the problem with which we had to deal was not a simple one. A great variety of types presented themselves. With the imperfect records at the disposition of the various courts, many women were old offenders. It was very soon evident that many were incapable of profiting by much book schooling; and on the industrial side could be trained only in the simplest sorts of unskilled operations. The group, however, which was most perplexing was that of young women who in many instances could readily pass through the public school grades but who had no self-control. These young women reacted to stimuli of various sorts in an abnormal manner. Often with good intentions and capable of responding to kind treatment so far as desire went, they lacked any stability or power of continuous effort. This group formed the disciplinary problem not only of the State Reformatory but of every other similar institution. As years went on, as superintendent I began to realize that much of the precious three years was being wasted in learning by experience to differentiate among these different types, to classify them, and to determine upon the special training needed in individual cases, so that not enough was left to accomplish anything like a re-education.

Moreover, the three years at our disposal includes the parole period. It follows that the longer a woman is retained in the institution the shorter the time she will have on parole; while it is true that the woman who needs the most training in the institution needs the longest outside supervision, if she is to make good. Much time and thought were given to experimenting and to thinking over this combined problem of time-saving and of adaptation of treatment to need.

In the summer of 1909, Miss Jane Day, one of the staff of the New York Public Education Association, spent the summer at Bedford Hills. She was given access to a group of eight or ten of the most difficult girls in the institution, who, for the most part, were in constant disciplinary difficulty. Miss Day had come to the Reformatory in the interest of the special classes in the New York Public Schools. She wished to study the results in young women who had not had such training as the special classes attempt to give. She was given free hand in her experiments with this special type of young women, and in the constant consultations and discussions with her over the problems presented by these selected individuals came a crystallization of much of that over which I had been pondering. One of the immediate results was an invitation for the summer of 1910 to Dr. Eleanor Rowland, at that time a psychologist at Mt. Holyoke College, to spend the summer in making psychological tests as to the mentality of a selected group of young women. Dr. Rowland devoted six weeks to the study of thirty-six girls. The results of this study are printed elsewhere [see the Tenth Annual Report of the New York State Reformatory for Women]. The outcome of the summer's study to my mind indicated the possibility of using psychological tests to determine in a general way the group to which a young woman belonged so far at least as her mentality was concerned.

In the fall of 1910, application was made to the New York Foundation for a grant sufficient to enable us to employ a trained psychologist on the Reformatory staff. The appropriation was made, and Dr. Weidensall was appointed. The appropriation was continued for two years. At the same time, the Eugenics Record Office at Cold Spring Harbor furnished us with one field worker and the New York School of Philanthropy assigned us one of its scholarship students for the same purpose. Thus the

psychological and the field work were well under way on a temporary basis before the establishment of the Laboratory of Social Hygiene and furnished the nucleus for its more permanent work.

Meanwhile, in the early spring of 1910, before the visit of Dr. Rowland, a group of gentlemen were entertained at the Reformatory by Mr. James Wood, President of the Board of Managers, and myself. This group included Mr. Lawrence Veiller, and others of the Committee on Criminal Courts of the Charity Organization Society, who brought with them seven or eight of the City Magistrates including Chief Magistrate McAdoo. In an after-luncheon conversation, where the subject of discussion was the difficulty which confronts magistrates in determining the disposition of young women who are brought into court and especially into the Night Court, I made the suggestion that I believed the day would come when all cases convicted in the courts would be studied by experts before sentence was passed as a guide to the determination of the proper place of commitment. I was asked by a member of the Committee on Criminal Courts to put the suggestions which I had made into writing. This I did immediately and a pamphlet entitled "A Rational Treatment of Women Convicted in the Courts of New York City" was printed for private circulation by that Committee.

One of these pamphlets reached Mr. John D. Rockefeller, Jr. The previous winter Mr. Rockefeller had been chairman of a Grand Jury which investigated vice conditions in New York City. The pamphlet interested Mr. Rockefeller sufficiently to cause him to arrange a meeting to discuss the plan proposed. The Laboratory of Social Hygiene is the outcome of the discussions with Mr. Rockefeller and others. Mr. Rockefeller had already conceived the plan which developed into the Bureau of Social Hygiene. This Bureau, as is told elsewhere [Introduction to Commercialized Prostitution in New York City. Kneeland, Geo. J. The Century Company], was organized primarily to study the whole question of prostitution, its causes, its extent, its control, and possibly its remedies. The Laboratory of Social Hygiene was established as one of the activities of the Bureau. While committed for all offenses from manslaughter down, the women at the State Reformatory with the exception of a very few have led lives of sexual irregularity while a very high per cent. actually have been engaged in a life of prostitution [Chapter VIII,

Commercialized Prostitution in New York]. Thus a careful study of these women would afford data on causes, individual and general, which lead to prostitution. Moreover, since the Reformatory has jurisdiction over these women for three years, there was opportunity rarely present in clinical studies for the "follow-up" of original diagnoses.

A plan was worked out with the approval of the State authorities, including the Attorney General, the Fiscal Supervisor, and the President of the State Board of Charities, which arranged for an affiliation between the State Reformatory and the Laboratory of Social Hygiene. A tract of land adjoining the New York State Reformatory was purchased by Mr. Rockefeller. On it was erected a building capable of accommodating fifty inmates and a staff of eleven persons. This building, known as Elizabeth Fry Hall, receives every woman committed to the State Reformatory. Its maintenance is provided by the Board of Managers of the Reformatory and the young women are at all times in the jurisdiction of officers appointed and paid for by the State. A laboratory building was similarly erected and the residence upon the property remodeled for the use of the scientific staff. By the terms of the agreement between the Laboratory of Social Hygiene and the State Reformatory the latter has the use of the Elizabeth Fry Hall and the services of the scientific staff in return for the privilege accorded the former of studying, through the staff of experts which it employs, the women committed to the Reformatory. The agreement was to cover a term of five years and went into effect September 1, 1912.

Dr. Weidensall was psychologist until October 1914. This volume presents some of the results of her careful and able work. Following Dr. Weidensall's resignation Dr. Mabel R. Fernald was appointed psychologist. The Laboratory, which is now under the direction of Dr. Fernald, maintains three departments at the present time:

*I. Department of Sociology.*

This department is in charge of a trained sociologist. Field workers make a very thorough investigation into the social history of each woman committed, including her heredity, her environment, her industrial and school record, her previous institutional record, if any, and in short, of all matters which concern

her relation to the various social groups in which she has been placed.

*II. Department of Psychology.*

This department for several years has been making a series of studies as to the mental capacity of the young women, but perhaps its most important function up to date has been its testing of tests. The results will appear as rapidly as is practicable.

*III. Department of Psychiatry.*

The psychopathic work was for a year and a half in charge of Dr. Alberta S. Guibord. Her studies are to be published.

Feeling the need of more completely controlling the conditions under which the psychopathic work was done, a special cottage for the study of psychopathic cases has been built, and from the 1st of August, 1916, the psychopathic work is to be directed by Dr. Edith R. Spaulding, formerly of the Massachusetts State Reformatory for Women. In this hospital we plan not only to study scientifically the psychopathic cases but to experiment with methods of treatment. The routine life of the cottage is to be in charge of Dr. Cornelia Shorer. The young women while in this cottage will be in the legal custody of a matron appointed by the State Reformatory for Women, and the maintenance of the patients will also be supplied by the Reformatory; all other expenses being met by the Laboratory. All initial physical examinations are made at entrance by the resident physician of the Reformatory, Dr. Margaret S. Halleck, in quarters provided for the purpose at Elizabeth Fry Hall. The proper blood tests for both syphilis and gonorrhea were made in coöperation, at first, with the Board of Health of New York City, but lately with the State Board of Health.

The purposes of the Laboratory have been three-fold:

*First:* To work out a methodology which may be applied in the future in a clearing-house through which all cases, or at least all cases which admit of a doubt, may pass with a view to determining their rational treatment. The working out of this methodology includes a testing of tests. Dr. Weidensall in this monograph presents our first publication of experiments along these lines. At the present time there is very great need of standardizing psychological tests and of evaluating them among the groups of persons working in various parts of the country.

Toward this end, also, Dr. Weidensall has more recently given the tests reported in this book, to a group of law-abiding saleswomen, factory operatives (cigarette factory and bookbinding), waitresses and hotel chambermaids of New York City.

*Second:* It has been also our hope to make a practical use of the results of our studies in determining more early in their career the special needs of each individual committed to the Reformatory with a view to classification and treatment.

*Third:* The whole study will in the course of time furnish a large body of data as accurate as is obtainable under conditions imposed, which will bear on the causes of prostitution and delinquency among women, and possibly point a way to, or emphasize, the need of special social reforms.

Recognizing that the study of the Bedford group includes only such women as in the judgment of the Courts are proper subjects for the Reformatory, the Bureau of Social Hygiene has made it possible beginning August 1st, 1916, to extend the study to include the various groups of delinquent women who are convicted in the courts of New York City. This study will include a group of consecutive admissions to the Auburn State Prison, to the New York Penitentiary and the Workhouse, to the Magdalen Home as representing a private institution which receives delinquent women (possibly individuals in other private institutions will be studied as well), and finally to the group of young women put on probation by our courts. Therefore, this study includes all groups of women who pass through the courts, and will furnish a basis of comparison as to difference in characteristics of the women who make up the several groups. It is hoped that it may throw some light on the problem of a possibly better correlation between the institutions which deal with delinquent women. Such a correlation should also include the possibility of commitment to a custodial institution for defective delinquent women. It is needless to say that it is already possible to commit a person who is manifestly insane to the proper institution. Owing to lack of provision at the present time, this is not true of the feeble-minded delinquent woman, whose proper care presents one of the most serious problems with which we have to deal.

KATHARINE BEMENT DAVIS.

New York City. September, 1916.

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# THE MENTALITY OF THE CRIMINAL WOMAN

## CHAPTER I.

### Problem and Selection of Tests.

This investigation is the outgrowth of an earlier one begun in the summer of 1911 under a grant from the New York Foundation. In its present form it has been carried on as one of the chief issues of the Laboratory of Social Hygiene. This laboratory was established by the Bureau of Social Hygiene in 1912, in affiliation with the New York State Reformatory for Women, for the study of the mental, physical and social history and condition of the criminal woman.

The original experiments were focused upon the possibility of securing a body of mental tests that could be applied after a woman's conviction and preceding her sentence and that would prove prophetic of her reformability. Dr. Katharine Bement Davis was at that time Superintendent of the Reformatory, and the problem grew out of her conviction that women proved guilty of crime might be more wisely sentenced than was possible under existing conditions. Altogether, it seemed that the devise of some method for making an early and reasonably certain estimate of the criminal woman's reformability was as vital an issue as was presenting itself to those who were dealing with her, to the judge who convicts and must sentence, to the Reformatory staff whose task is to fit her in approximately eighteen or twenty months for future law-abiding behavior, to the State taxed to

make the best and least costly adjustment between her needs and the welfare of society.

It is inevitable that an institution whose function is the reformation of its charges must be more expensively equipped than one whose function is merely to support and protect from themselves a group of feeble-minded or entirely unfit individuals. This being the case, it is short-sighted and uneconomical to sentence to a Reformatory individuals who at best go through but the external form of industrial training, which, though its cost is as large per capita as though they could profit by it, is almost lost upon them so far as their ultimate ability to adapt themselves to social conditions at large is concerned or their capacity to make use of their training.

Once established, such a basis for diagnosis would supplement and facilitate the work of the court probation officers. It would enable the judge better to deal with these women in terms of their actual ability to be reformed, instead of, as at present, so largely in terms of their crime and of the passing impression different ones of them make upon him as he sits upon the case, often in a crowded session. It would minimize the more obvious and extreme instances of inadvisable sentences of the present system under which a high percentage of insane, feeble-minded and those physically too seriously handicapped to profit by its training are committed to the Reformatory, and usurp the places, meantime, of others more capable of direction and possible reformation. It would tend to prevent the sentence to the reformatory of those types whose presence makes its discipline unnecessarily rigid and complicated, who absorb a disproportionate amount of the time and efforts of the teachers, matrons and parole agents and without whom more freedom and opportunity for self-government, more responsibility, could be given to those possessed of sufficient insight to build up a new system of better formed convictions of right and wrong conduct. It must not be imagined that it would lead to the exclusion of all those who are the troublesome ones, the disintegrating members of an institution, for not infrequently it is this type who themselves are most worth the ministrations of the Reformatory, simply because their misconduct is precisely the result of their lack of discipline and self-control. On the other hand, the *capacity* to

absorb training and to attain equilibrium and self-control is indispensable and the tests would be a device for the recognition of this *sine qua non* for reformatory training.

The determination of such a body of tests was, of course, an uncertain undertaking. In the first place, applied psychology is in its infancy, except in certain of its educational phases. In the second place, no one seemed altogether sure of what constituted reformation, and there seemed to be even less certainty as to what would constitute the exact circumstances under which one might be justified in predicting that a woman was reformed in any final sense. Were we to secure tests that might prove her capable of temporary reformation under parole conditions, or must they indicate capacity for more permanent reformation? Here we set for ourselves the following arbitrary standard: if an individual has the capacity to learn a trade, to be industrially self-supporting, and is intelligent and stable enough to adapt herself to ordinary social and industrial conditions, she is worthy the chance of reformation. Whether a body of tests were discoverable that would establish the possession of these virtues was in itself problematical.

There were two ways to go about the possible isolation of the reformable individual. One might first eliminate those who were obviously unfit and then endeavor to draw finer individual distinctions among those who were left as to their varying needs and possibilities of development. From such a point of departure one might accept the popular assumption that the feeble-minded need permanent custodial care, and seek for some method, such as the Binet tests, to eliminate them. Or, one might approach the problem from the other side and begin first to determine norms and the range of mental ability displayed by law-abiding women whose schooling, social and industrial opportunities were akin to those of the women we wished to understand. In the last analysis, without such norms for the law-abiding woman's mentality, of her earning capacity, of the amount and kind of training she has had, together with some data respecting the character of her home conditions, we should not be in a position to assume with any assurance on the basis of any tests whatsoever how far a given individual who had not been law-abiding varies from, and may be expected to approximate to, normal conditions and prove reformable.

varies from, and may be expected to approximate to, normal conditions and prove reformable.

With the first grant from the New York Foundation, in so far as we knew, there was but one year in which to prove that such a group of tests was not an impossibility. The issue was important and the time too brief to consume it in untried tests. If there were any reasonably good ones that had already been used and had to some extent proved successful, it behooved us to incorporate them. Our one conviction was that to be most useful as a means of practical diagnosis the tests ought to involve a minimum of apparatus, time and laboratory technique.

Unfortunately, at that time almost nothing had been published with respect to the mentality of the criminal woman or the normal working woman, and more especially with respect to mental tests as applied to either of them. Only the Binet tests were available and they were in a preliminary stage of standardization and had not been very extensively applied to the criminal woman. It did not seem likely that as they stood they would prove useful for purposes of close individual diagnosis for mature women, yet it was impossible to overlook them, because so much was being claimed for their reliability for the isolation of the feeble-minded. None of the more recent criticism had then been published and there was much in the method to make it seem worth while to test its value for our purposes with a representative series of women. If the Binet tests proved successful only as a means for isolating the feeble-minded from those who were more intelligent, something definite at least could be attained within the year. Accordingly we applied these tests to two hundred successive commitments, as they came to the Reformatory from the courts. The result of this investigation will be published elsewhere. Suffice it to say that only one subject succeeded in proving herself as old as twelve years by these tests. It follows that, unmodified, they were inadequate for our purpose, for all of the inmates of the State Reformatory are not less than twelve years old mentally. Among those who failed to pass all the Binet tests was one who was an expert stenographer and another who had been a successful teacher in the Brooklyn public schools for a number of years. Too, not a few were

sure to prove reformable, *i. e.*, become law-abiding for a period of years at least, unless the practical experience of the Institution was not to be relied upon. We realized that part of the difficulty inherent in these tests was due to the scarcity of those beyond the ten year group; chance failures in the eleven and twelve year tests could not be compensated for by possible success in others of equal difficulty had they been available. The thirteen and fifteen-year-old tests were confessedly only tentative. Besides this they proved to be of distinctly unequal difficulty and quite unsafe for purposes of diagnosis. The scale at the younger ages was better. The chief difficulty was one that has since been pointed out by Stern and others—the scale was not finely enough graded to isolate significant individual differences. There was no device to do more than discover that an individual was, or was not nine years old mentally. To determine that she was an energetic, quick-minded nine-year-old, capable of further development under fairer conditions, or that she was a dull, slow, clumsy individual of nine mental years who had already reached about the limit of her capacity to develop, was for the most part outside the range of these tests. It was not at all improbable that the Binet tests could be modified to meet such conditions as ours. It seemed to the writer, however, as the result of a number of preliminary tests in reaction time, rate of learning, mental alertness, etc., which had been given at the same time, that more useful and quicker results were likely to be reached along other lines of investigation.

The Laboratory of Social Hygiene had meantime been established, which assured the continuance of research for a period of five years. Under these circumstances it seemed idle to proceed further with any set of tests until norms for the law-abiding woman had been established. To have secured these standards for ourselves would have necessitated an immense amount of time and experimentation. It would undoubtedly have delayed the real issue by a number of years. However, we had chosen a series of tests and had succeeded in testing with them a small group of expert college maids, when, to our good fortune, matters were greatly expedited by the discovery that the norms and the data we so much needed were being in

large part formulated by the Bureau of Vocational Guidance. This Bureau is connected with the Working Certificate Office in the Child Labor Division of the public schools in Cincinnati and is under the direction of Dr. Helen Thompson Woolley. They have furnished a timely and useful series of standardized tests.

The application of these tests to the Reformatory women constitutes the major portion of this monograph.

The norms furnished us by the Vocational Guidance Bureau, in so far as they are already available, are for groups younger than ours. This is really an advantage, in that they furnish standards for fourteen- and fifteen-year-old working girls—standards that are quantitatively graded to give both gross and minute individual differences of ability and thus make it possible to determine with exactness the per cent. of our charges that are no older mentally than the fourteen- or fifteen-year-old girl. Inasmuch as Dr. Woolley's subjects at the age of fifteen, after a year of work, tested higher in almost every respect than they had at fourteen years of age, and inasmuch as the better ones of our women tested very little better and sometimes less well than the fifteen-year-old group in all the mental tests save one, it proved really fortunate that the standard group was not older. We have, however, given certain ones of these tests to a group of eighteen college maids, who have had successful working records and who represent the better type of servant of the same age as the women who constitute the Reformatory group. Work and school records and home conditions were secured for this group also. There has not been time to test a larger number; this will be done later, but it seems inadvisable to withhold from publication such data as we now have at hand.

To quote from Dr. Woolley, the Bureau of Vocational Guidance has for its ultimate object "the comprehensive study of the problem of child labor with a view to furnishing scientific demonstration of the effect of child labor on children who enter industry early. To make the study complete, it seemed necessary to include the following phases: the educational history of the children investigated; their physical development on going to work and from year to year afterwards; their mental develop-

ment on going to work and from year to year afterwards; the industrial history of each individual; the home environment of each individual; the general industrial conditions in children's occupations. Facts along all these lines have been recorded on a series of six schedule cards." The children tested were a group of eight hundred of the boys and girls who came to the Working Certificate Office first during the year 1911–1912 to secure working papers. The law required that they be at least fourteen years of age and that they should have completed at least the 5B grade. Three-quarters of all who so presented themselves were fourteen years old and of these as many were tested as the laboratory force could handle. They were tested as they came in serial order whenever a member of the staff was free to examine another of them. The eight hundred tested were distributed fairly evenly with respect to the grade they were leaving, about one-quarter having finished the fifth, sixth, seventh, and eighth grades, respectively. The original scheme made provision that each of these children should be followed for a series of five years of industrial history. To date they have been re-tested with the mental and physical tests for each of three succeeding years, and, that the changes in their mental and physical measurements—their improvement, lack of develment, or deterioration, as the case might be, together with increasing or decreasing efficiency, might be evaluated, a control group of children of the same age, in the same grades, who did not leave school, have likewise been tested and retested each year.

The group of mental and physical tests selected by Dr. Woolley is a fortunate one for our purpose. In the first place they are thoroughly representative; better still, they were so selected that they may be given in an hour's time a distinct advantage if they are to be used in a clearing house. The medical and home conditions of the children have been recorded and are to be tabulated with respect to norms and significant group differences. Most important of all, perhaps, is the fact that the working records, the number and kind of jobs held each year, the wages and the increase in wages, the reasons for leaving each time a job was abandoned, the disposal of wages, the reason for the

girl's going to work, have been tabulated and interpreted for the first years of working history. The data for the control group —the children who are still in school—have not been tabulated as yet. Most of the first two year's testing for the working children is shortly to appear[1] as one of the Monograph Supplements to the Psychological Review.

For comparison in this study we have used only the records of the working *girls*, those of the boys have been disregarded.

The women committed to the Reformatory belong almost without exception to the industrial class: they are factory operatives or domestic servants for the most part. Most of them left school at fourteen or very nearly fourteen years of age "to go to work." Thirty-nine per cent. of them had not gone further in school than through the 5A grade; sixty-one per cent. had completed the fifth, sixth, seventh or eighth grades, and so at the beginning of their industrial career were presumably at about the same stage of mental and physical development as the working children examined by the Bureau of Vocational Guidance.

A parallel investigation of these two groups,—the working girl during her first five years of working history, and the type of working girl who on the average within six years after leaving school has become an inmate of a State Prison, ought to prove valuable. Whatever correlation may be proved to exist between the grade completed, the home and physical condition, the amount of motor skill and mental ability of those girls who prove most reliable and successful with respect to their working history and those who prove unstable and unsuccessful, may thus be finally determined and standardized. The Bureau of Vocational Guidance has put its records and tables at our service. For the reader's convenience we have printed Dr. Woolley's account of the method and the critique of her tests practically in full in the following pages as "*Standard Method.*" We have given these tests with such modifications as are indicated in the descriptions of them to one hundred commitments as they came

[1]Since this was written, the study to which reference is made throughout the present monograph has been published. See HELEN THOMPSON WOOLLEY and CHARLOTTE RUST FISCHER, Mental and Physical Measurements of Working Children. *Psych. Mon.* 18: 1914, No. 77. Pp. 247.

to us consecutively, omitting only the colored women and the few who were discharged on writ or were too ill at the time of entrance to be given the tests.

To repeat, the advantages of using the norms of the Vocational Bureau as a basis for comparison are that they represent the record of the *working girl* at the beginning and during the first years of her industrial life, that the mental tests at fourteen and fifteen years seem to correlate fairly well with school grade, a familiar and available standard, that the same group in the near future will be checked with respect to mental records, home conditions, physical equipment, working record, wage earnings and law-abiding record for a period of five years, furnishing norms from fourteen through eighteen years of age; finally, that, if at the end of all or any of these years' investigation there proves to be a correlation between certain norms in the tests and given degrees of industrial efficiency or with law-abiding or non-social history, there will be furnished standards in terms of tests which can be carried through in so short a time as to make them entirely practical of administration in a clearing house.

The chief merit of these tests, beyond the fact that they establish norms for the fourteen- and fifteen-year-old girl in a fair range of tests and thus supplement the Binet tests at a crucial point, lies in the method of scoring. The tests and methods are such as to admit of the measurement of small individual differences and to furnish a sliding scale representing the varying degrees of mental capacity or motor skill characteristic of the groups in question. As Dr. Woolley points out, for young children, who tend to differ more or less radically from year to year and who on the average cannot do a given task at one age and can a year later, the Binet method of treating a response as either right or wrong is feasible. For adults, on the other hand, and probably for children as young as eleven and twelve, individual differences, unless the subject is mentally no older than nine or ten years, are rather those of *degrees* of accuracy of performance and rate of accomplishment than of absolute ability or failure to do a test. A definite range of efficiency can be established for each year beyond eleven at which there is improvement, and the age at which improvement stops will mark the

range of ability characteristic of the adult in any test in question. With definite percentile records characteristic of the median, 75th and 25th percentile records of any group, it is possible to determine whether a given individual on examination is average, above or below average, in the best or poorest quarter, or outside the range of the standard group. If the reference group includes the entire gamut of individual scores, the subject's exact numerical position may even be determined; that is, it may be determined whether he is 10th or 50th or 61st, etc. It is for this reason that the total list of our subjects' scores have been included in this manuscript. They constitute a scale representative of an average and typical hundred criminal women who have been sentenced to a Reformatory. The complete list of the Maids' records is also given. Other tests than the ones herein used should be standardized in the same way with normal subjects and their relative usefulness thus determined.

At the present writing, the Vocational Guidance Bureau ha established norms for the fourteen-and fifteen-year-old groups only in the mental and physical tests and working records. From duplicate record cards we have isolated those of the fourteen and fifteen-year-old working girls who have passed only the fifth and sixth grades, and who are thus, other things being equal, retarded when judged in terms of their school standing. For this group of *retarded working children*, which constitutes about fifty per cent. of the total number of children leaving the schools to go to work, we have computed norms. From a chart loaned to us by Dr. Woolley, which tabulated the total number of jobs, the number and kind held by each girl, the length of time each job was held, and the wages received in each for the first year of working history, we have made two tables indicating the differences in industrial opportunity and record for these who had completed the fifth and those who had completed the eighth grade respectively, *i. e.*, the poorest group and the best group of individuals as rated by the schools and by the tests. From record cards we have quoted a number of descriptive accounts which indicate the differences in home conditions of these two groups—the fifth and the eighth grades. The comparison is an interesting one and suggestive of the significance of such data.

With respect to school records where the actual record was not obtainable, it was possible by cross-examination of the subject to be reasonably certain how long each had remained in school and what grade she had completed. A majority of them had fairly definite ideas with respect to their reasons for leaving school. They seldom liked it. They are greatly exercised for fear they may have to go to school in the Institution, and we find, in terms of those records which we have verified, that they tend to set too low the grade they were last in at school, in order, presumably, to impress us with the futility of putting them in school again.

It was difficult to secure accurate data with respect to the work records of the women under our care. The women know that parole rests in large part upon their ability to work. This leads them to exaggerate. Furthermore, they have held so many of their jobs for so short a time and have taken their industrial experiences with so little seriousness that they are literally unable to tell us the facts. Here, as perhaps nowhere else, one realizes how little meaning time has for most of these women. They worked "until they were married,"—and how long ago was that? "*About* three years"—it may have been two or four. "I began to work after my baby (illegitimate) was born." When was that? "Well, let me see; I am twenty-one; the baby was born when I was seventeen, no when I was sixteen, and that makes the baby four years old now, and so I must have been working about four years." Or "I held that job a long time." How long? "Three or four months." Or "I was there six months or a year—I don't know." The inquirer is baffled both by their heedlessness and by their inventions. One can quiz them incidentally about the type of work they did in the shop they mention and assume that, if they can describe the process with some degree of detail, they really worked there. If the number of years they report having worked makes them older or younger than they are, we can suggest that we begin over again and find out what the trouble is, but they will simply claim that they may not have worked quite so long as they thought in certain of the jobs, though in which ones they cannot say. Their attitude toward work has been one of indifference

and their accounts of it are yet more so. The only points they report with any promptness and certainty are their reasons for leaving their jobs. Where we have been able to verify the reasons for leaving, we have found that many times when they report having left because they were "tired of the job," they were really "dismissed" by the employer. But when one comes to inquire more closely into the reasons for the dismissal, their own reason is as true to the facts as the employer's, for the occasion for dismissal often reduces to carelessness or staying out late or impudence or some bit of irresponsibility which might well be the result of weariness with the place or at least of an entire lack of seriousness with regard to possible dismissal.

It is impossible to verify all of these records. Those women who are over twenty often have not worked for a number of years or have worked so interruptedly that it would be useless to try to find their various employers. Their occupations have been in factories and stores where a long succession of employees have come and gone, unregistered and completely forgotten by the employers. It is only by following a group such as the Cincinnati working children during its first years of work and contrasting the work records of those who do, and those who do not become law breakers that we can hope to discover with any degree of exactness the sort of industrial and economic experiences peculiar, if such there be, to the criminal woman. We have tabulated the records which we have obtained, but claim for them no great measure of accuracy with respect to the actual number of weeks worked, or number of jobs held. Their chief significance lies in the dfficulty of obtaining them at all and in the attitude of the subject toward work that is indicated by the reasons she offers for leaving the jobs. Into the account of these reasons we have incorporated enough of the subject's story to indicate clearly how different even at the ages of fourteen and fifteen many of their records are from those of the standard group.

That portion of our records which is herein published is limited largely to the data corresponding to that which the Vocational Guidance Bureau has found it possible to tabulate thus far. Without their standards our further results have so much

less value that we feel it best to withhold them for the most part until such time as the standards are available.

For the standard group there are norms for the total groups of the fourteen- and fifteen-year-old girls for each of the following tests:

1. Height.
2. Weight.
3. Strength of Grip, Right and Left Hand.
4. Rapidity of Movement and Indexes of Fatigue.
5. Steadiness of Hand.
6. Card Sorting.
7. Cancellation of the Letter "a."
8. Memory Span and the Per Cent. of Seven, Eight, and Nine Digits Remembered.
9. Substitution.
10. Completion of Sentences.
11. Association by Opposites.

There are also separate curves for the various school grades. Of these we have for the most part reproduced only the extreme grades, the fifth and eighth. In Card Sorting and Opposites, we have tabulated all the grades separately, as typical of the correlations that hold between grade completed and score in test for our group throughout them all as for the standard. There are separate standard curves for those who have had more than half of their schooling in parochial or in public schools. This distinction we have not made, partly because the total number of women tested was not large, but chiefly because only a very small proportion of the total number of Catholic girls have been trained in Catholic schools.[1]

With but few exceptions all the women herein tested are still in the Institution. Until they have been paroled and discharged at the expiration of their sentence, it will be possible only to surmise the relation between even temporary reformability and those who test best or poorest by any one, or any combination of these tests. In the last analysis, for practical purposes

[1]This must not be taken to mean that the per cent. of the total number of those so educated who are convicted of crime and sentenced to a reformatory, is relatively less than of those not so trained.

within the Institution at least, the final test of a test of reformability is that it isolates some one quality or quantity of response in a given record or series of records that is characteristic in a high percentage of cases to those who keep their parole. On the other hand, to apply success on parole as a final measure of these tests is somewhat unfair since the limitations of the appropriation to our state institutions make possible only a few of the most simple and most important types of training. It is a serious limitation, for example, to have but one teacher for cooking and waitress classes in an institution where the daily population is approximately five hundred, of whom a large majority, when placed out on parole, must be placed as housemaids. These women, like ourselves, are much more likely to become dissatisfied in a place where they are not trained to do the work. Nearly ten per cent. require and merit more specialized training than the institution has facility for giving. Another difficulty with parole conditions as a measure of the tests is that of finding the right job for each individual. If we are to judge her reformability by her conduct on parole, she should, of course, be placed where she will be fairly well treated, where she is able to do the work, where she will not be too lonely, where she will be in a neighborhood that will not subject her to more than ordinary temptations. Until the last year there has been only one, and there are now but two parole officers to conduct all newly paroled girls to their positions, to bring all the dissatisfied ones back, to settle all the disputes between mistress and maid, to visit every girl on parole once a month. Most of the Jewish women are paroled under supervision of a worker provided by the Jewish Council of Women of New York City, who visits the New York Reformatory weekly to give religious instruction and to become acquainted with the women; some of the girls who have been connected with the Episcopal Church are cared for by the Church Mission of Help of New York City, but the Reformatory is ultimately responsible for all of them and inevitably there is too little supervision to let the present condition of parole play any very final part in estimating the value of any set of tests. That with careful analysis of the conditions of parole for each of them, the parole records can be helpful is undoubted, and two years from

now when these women have been discharged and when Dr. Woolley has completed her five years of industrial records, a supplement should be published to this report making final correlations and interpretations.

The resident physician of the Reformatory was too pressed with routine work to do much more than was absolutely essential for institution purposes in the way of physical examinations. Fortunately, during the summer of 1913, Dr. A. S. Guibord joined our staff and gave a thorough physical examination to as many of this series of one hundred women as she was able to see during the three months of her residence. From her record cards we have made the chart which appears in the following pages. To this chart we have added the report of the Bureau of Contagious Diseases of the Department of Health of New York City with respect to blood tests for gonorrhoea and syphilis among these subjects, carried on in the laboratories of New York City.[3] The physical examinations and histories taken in the Vocational Guidance Bureau were of necessity slight and they have not as yet been tabulated.

Of the one hundred women tested, only eighty-eight are used in the following percentile tables and curves. The twelve omitted were foreign women who had so much less facility in English than in their own language that, even though some of their records were relatively high, they were appreciably lower than they would have been, had we been able to give the tests in Polish, Yiddish, Russian, etc. These omissions tend to eliminate more of the less intelligent and less schooled ones, so that the final tables and curves are a little better, rather than a little worse than would have been the case could we have tested the women in their own language and included the whole hundred. Had we included them with their linguistic handicaps, the records would have been certainly worse and it seemed to be better to err in the direction of a slight overestimation than to underestimate the group. Moreover, the group tested in Cincinnati was even further limited to comprise only native born white children.

[3] The method pursued in the analysis is described in the chapter devoted to the personal histories of prostitutes in the volume published by the Bureau of Social Hygiene on "Commercialized Prostitution in New York City."

The women herein reported upon were admitted between the first of January and the end of October, 1913. The Annual Report of the year Oct. 1, 1912, to Sept. 30, 1913, included all but the last half-dozen of them. During the year two hundred and eight in all were committed to Bedford, so that our one hundred cases represent almost fifty per cent. of the admissions. That the one hundred tested were fairly representative of the whole group may be seen from the following tables.

| | *Place of Birth* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total 208 | | Total 100 | | Bedford 88 | | 12 Omitted | |
| | No. | Per cent. | No. | Per cent. | No. | Per cent. | No. | Per cent. |
| Born in U. S.... | 156 | 75.0 | 72 | 72.0 | 72 | 81.8 | 0 | 0.0 |
| Foreign Born... | 52 | 25.0 | 28 | 28.0 | 16 | 18.2 | 12 | 100.0 |

| | *Religious Affiliations* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total 208 | | Total 100 | | Bedford 88 | | 12 Omitted | |
| | No. | Per cent. | No. | Per cent. | No. | Per cent. | No. | Per cent. |
| Jewish..... | 25 | 12.3 | 12 | 12.0 | 8 | 9.1 | 4 | 33.3 |
| Protestant..... | 87 | 41.8 | 36 | 36.0 | 38 | 43.1 | 2 | 16.7 |
| Catholic..... | 96 | 45.7 | 52 | 52.0 | 42 | 47.7 | 6 | 50.0 |

Dr. Davis has shown elsewhere that a comparison of these figures with the percentages of Jews, Protestants and Catholics in the total population of New York City can be indicated only roughly, for there is no data, so far as we know, with respect to the city that is inclusive of the entire population. The United States Census Bureau in 1906, apparently the latest authoritative study, leaves 43.4 per cent. of the population without church connections. In the World's Almanac for 1913 one finds a statement to the effect that there are 905,000 Jews (racially, not merely religiously) in New York, *i. e.*, about 19 per cent. of the total population. The Census for 1906 indicates that 33.38 per cent. are Catholics and 8.8 per cent. Protestant. Among

the remaining 38 per cent. there are probably more whose original affiliations are Protestant than Catholic. There are more and larger private Catholic institutions, the House of the Good Shepherd, for instance, to which the Catholic girls may be committed, and accordingly the number of Protestant girls received at Bedford is high. Dr. Davis states that personally she believes that "if we had the necessary data, we should find that, as in the case of the Jewish women, the Protestants and the Catholics would contribute in about their proportion to the community at large to the whole group of prostitutes."

*Age*

| Average Age of Total 208 | Average Age of Bedford 88 |
|---|---|
| 21 years, 9.5 months | 21 years, 5 months |

*Number Married*

| | Total 208 | | Total 100 | | Bedford 88 | |
|---|---|---|---|---|---|---|
| | No. | Per cent. | No. | Per cent. | No. | Per cent. |
| Married..... | 69 | 33.1 | 32 | 32.0 | 29 | 32.9 |
| Single..... | 139 | 66.9 | 68 | 68.0 | 59 | 67.00 |

The sections immediately following are concerned with the procedure and the results of the mental and physical tests. If the reader, before considering the reactions to the mental tests, desires to know more of the type of offense committed, the number of previous arrests, of the general social, industrial and personal history of the women concerned, a brief sketch of the data available on these points may be found in Chapter V.

## CHAPTER II.

### Tests, General Methods, Classification of Groups Under Comparison, and Original Records.

As the immediate purpose of this investigation was the determination of the manner in which a representative group of criminal women compare in physical development and mentality with the working girl of fourteen and fifteen years, it was essential that we should duplicate as exactly as possible the methods of testing and evaluating results that were in use with the standard group. We have presented the tests in the same order and have divided them into the same groups of physical and mental tests as did the investigators of the Vocational Guidance Bureau, so that any one wishing to make further comparison of our results with their published records may meet with the minimum of difficulty in so doing.

In giving the directions to our subjects there has been throughout one divergence from the standard; we have spoken much more slowly and with greater emphasis than was necessary in the case of the Cincinnati group. This was partly the unconscious result of association with the defective type, but chiefly a conscious effort to err in the direction of giving these women, if possible, as clear an idea of what they were expected to do in each test as the subjects in the standard group were sure to have. With her own subjects Dr. Woolley's aim was to make the directions so clear and unequivocal that failure in any test should be due to genuine lack of ability in the particular sort of performance involved, not to failure to understand the directions. The need for whatever additional emphasis we gave will become clear as the account of the tests proceeds.

Testing this type of woman steadily for three years with many varieties of test has brought the conviction that the essential thing which lies at the basis of their variation from the normal is *a slowness to understand what is required of them that is quite disproportionate to their absolute ability ultimately to comprehend and accomplish the task in question.* The moment the limits of

what one of these women has laboriously learned are exceeded, whether it be in a matter of motor habit or of mental control, it is as though she had suddenly become dull of hearing or had lost all clearness of vision. This characteristic exists in varying degrees from the extreme instance of one whose dullness is so impenetrable that no device can make her understand even fundamental tasks and ideas, to one who is even above the normal understanding. The analogy of the sensory condition in which the summation of stimuli will in the end bring a clear consciousness of the specific bit of experience is a close one. Their minds are, as it were, always at a greater distance from the object than is the normal mind; if not too far, repetition and emphasis will finally, and often suddenly, bring recognition of the issue. So, we felt it best to speak emphatically and to endeavor at all costs, short of actually helping them with the content of the test itself, to insure a normal degree of understanding. In spite of this intention and of our acquaintance with the type, they were not always made to understand what was wanted, as will be pointed out.

To estimate the value of the tests for use in a clearing house it was necessary to apply them as immediately following the subject's conviction as we could. According to the rules of the Institution, each newly admitted inmate must be kept in isolation from the others for a period of two weeks after her reception The women were tested during this quarantine period. In addition, the advantage of testing at this time was threefold. It avoided communication with others who had already been tested—a very real advantage; it obtained a record of initial performance, so that retesting immediately preceding parole would permit the determination of how much and in what ways each had improved by the discipline and training of the Reformatory; most important of all, perhaps, after three or four days of confinement, the women were so lonesome that it was a great boon to be taken to the laboratory, which was some distance away. If, during the test, a subject's interest flagged or her attention wandered, it was only necessary to say, "Are you tired? Shall I take you back?" or "If you will do this test as quickly and as well as you can, I will bring you back this afternoon and let

you try some others." During quarantine there is little to meditate on save the wish to be free. When they are told that, if they do well in these tests, it will help them to an early parole, they are vitally interested in doing their best. Communication with older residents, who are apt to be suspicious or supercilious with respect to "being tested," was thus ruled out and our subjects came to the laboratory unprejudiced. With one exception we had their co-operation and friendliness throughout.

The tests were all given by the author. The laboratory room was quiet and pleasant. Frequently the first remark the subject made was: "Isn't this a pretty place!" During the progress of the test no one save the experimenter and the subject was in the room. The tests were given uniformly in the same order. If there was any suspicion that a woman was not well or was temporarily not in a good humor, she was not taken to the laboratory until a later day when she was in as fair a state of well-being mentally and physically as might be expected of her during these first two weeks. There were some few women who were suffering from drug habits which could not be counteracted in the brief time of quarantine. These were tested on the last day of the quarantine period.

The attention and co-operation of the subject were firmly established before each test was given. No records had to be discarded because of defective method or interruption. The poorest quarter of our group, therefore, represents real subjective limitations. This is not so true for the poorer quarter of the Cincinnati records, for the tests were given under conditions such that it was impossible to avoid occasional mishaps and interruptions. We mention this fact only because it emphasizes that the advantage is all with our group, so that if they fall below the standard series, they do so with everything in their favor. It was essential to secure ideal conditions of testing, since under the standard method the subjects were not to be tested twice with any of the tests. With less care, it would have been necessary to test many more women. A larger number of subjects would of course be an advantage in any case, but where the need was so great to secure working results as quickly as possible, it was necessary to stop with one hundred.

The standard tests which were given are:

*Physical Tests.*

1. Height.
2. Weight.
3. Strength of Grip.
4. Steadiness of Hand.
5. Rapidity of Movement and Indexes of Fatigue.

*Mental Tests.*

6. Card Sorting.
7. Cancellation of the Letter *a*.
8. Memory Span and the Per Cent. of Seven, Eight and Nine Numbers Remembered.
9. Substitution.
10. Completion of Sentences.
11. Association by Opposites.

There were four standard tests in the Cincinnati fifteen-year-old series which we did not give,—Visual Acuity, Auditory Acuity, Vital Capacity, and the Puzzle-Box Test.

Besides the Cincinnati tests, the series already in use in our own laboratory was given to this special group of 100 inmates. In this way we were able to compare them with other, and larger, groups of Bedford women. Of these tests there are included in this monograph:

1. Woodworth and Wells' Cancellation of Numbers.
2. Binet's Memory for Number Series.
3. Facility and Character of Handwriting Checked in Terms of Ayers' and Thorndike's Measuring Scales and Correlated with Binet Age.
4. (a) Rate and Character of Reading, Correlated with Binet Age.
   (b) Number of Ideas Recalled.
5. (a) Woodworth and Wells' Standard Directions Tests, Easy and Hard.
   (b) Two New Verbal Directions Tests.
6. Ability to Tell Time, Correlated with Binet Age.
7. Healy-Fernald Tests (a) Cross Line A. and B. and the Code, Correlated with Binet Age, (b) Construction A. and B.[1]
8. Formation of New Motor Habits, Mirror Drawing Test as Described by Whipple.[2]

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[1] The Vocational Guidance Bureau gave this test also, but their puzzle was cut to have one piece fewer than the Healy form, and results are not comparable.

[2] Guy Montrose Whipple: *Manual of Mental and Physical Tests*, Warwick & York, 1910, p. 343.

Tables and curves sum up the differences and likenesses that appear as a result (1) of the comparison of the Bedford group as a whole with the working children of the Vocational Guidance Bureau, (2) of the comparison of those among the Reformatory subjects who had left school from grades as high as those attained by the Cincinnati girls and (3) the comparison of those who had not reached grades as high as the standard group. In our total group there were 88; among the Cincinnati working children the numbers varied slightly from test to test, and the numbers retested at fifteen after a year of working record were of necessity less than the total number tested at fourteen when the children came for their working papers. There were from 330 to 317 in the total number tested at Cincinnati at fourteen and from 281 to 278 of these were retested at fifteen. Upon these numbers the percentiles for the working children have been based. The maximal number in the various grade groups of the working girls in any test was, at fourteen:

69 in the fifth grade,
102 in the sixth grade,
98 in the seventh grade,
61 in the eighth grade.

At fifteen:

60 in the fifth grade,
90 in the sixth grade,
86 in the seventh grade,
49 in the eighth grade.

In each test a few records of the working children had to be discarded because of an error in giving the test or in recording the score or from some unavoidable circumstance. There were as many as thirteen omitted from an occasional test, but seldom more than four or five. The exact number omitted in any test may be obtained by consulting the published records of the Bureau of Vocational Guidance. The exact variations were too small to be of moment here. The curves of the total number of working girls at fourteen and fifteen years of age are those of the public-school girls only. Dr. Woolley has tabulated separately the public and Catholic-school girls, and since so few of our

subjects were educated in the Catholic schools, the public school curve is probably the fairer for comparison. The maximal number in these groups was 172 public-school girls tested at fourteen and 145 retested at fifteen.

For each of the standard tests which follows, there is a table which gives the 25th, median and 75th percentile scores for:

(1) The total group of 88 Bedford women, referred to as the *Bedford 88.*
(2) The total group of Cincinnati children retested at the age of fifteen years, referred to as *C. 15,*
(3) The total group of Cincinnati children as first tested at fourteen years, referred to as *C. 14,*
(4) Those of the Cincinnati group who may be regarded as retarded, *i. e.,* who have not succeeded in passing beyond the 7A grade at fourteen years of age, referred to as *C. Ret. 14* and *C. Ret. 15* according as one refers to the first or second testing of this group,
(5) The thirty-four of the Bedford 88 who have had less schooling than the completion of the 5B grade, *i. e.,* less than even the retarded group of working children, referred to as the *Below-Grade Group,*
(6) The fifty-four of the Bedford 88 who have succeeded in passing at least the 5B grade, referred to as the *Grade Group,*
(7) The nine of the Bedford 88 who have passed the 5B or 6A grades, referred to as *B. V,*
(8) The sixteen of the Bedford 88 who have passed the 6B or 7A grades, referred to as *B. VI,*
(9) The sixteen of the Bedford 88 who have passed the 7B or 8A grades, referred to as *B. VII,*
(10) The thirteen of the Bedford 88 who have passed the 8B or some higher grade, referred to as *B. VIII,*
(11) The eighteen efficient *College Maids.*

The percentiles for the retarded group we have compiled from duplicate record cards of the fifth- and sixth-grade groups sent to us by Dr. Woolley. The medians and percentiles for these two groups and for the various Bedford groups were obtained by counting the individual record cards and securing the literal median, 25th and 75th percentile records. The percentiles for the C. 14 and C. 15 were sent to us by the Vocational Guidance Bureau. The method for obtaining them was based upon an

estimated position in a group, not on a count of individual records. For the larger groups of the Cincinnati children, this method would vary but slightly from the actual median and quartal record.[1]

For each test or phase of a test there are three sets of curves, which have been differentiated by the following plan:

A. Bedford 88
15-year-old Working Girls (C. 15)

B. Bedford Grade Group
Bedford Below Grade Group
15-year-old Working Girls (C. 15)
14-year-old Working Girls (C. 14)

C. (a) Eighth Grades
Bedford VIII
C. 15 VIII
C. 14 VIII

(b) Fifth Grades
Bedford V
C. 15 V
C. 14 V

Throughout, the curves are so arranged that the values on the abscissas read in the same direction with respect to degree of achievement in the different tests. The better the record, the nearer it is to the meeting of the ordinates, *i. e.*, the nearer to the left. This means that curves of time scores and indexes follow the approved method of the lowest numerical score at the left. In cases of per cent. of accuracy, however, the higher numerical scores are at the left. The percentiles, too, quite without respect for the numerical magnitude of the actual scores themselves, have been arbitrarily arranged so that the *25th percentile always refers to that record which is one fourth of the subjects from the best record.* The 75th percentile is the record which is one fourth of the distance from that lowest in achieve-

[1] It is a method, however, which sometimes, as in Memory Span, gives rise to a figure which is unlike any actual record and demands some accepted method for comparative use. In Memory Span, for instance, shall an estimated 7.5 numbers recalled be counted as 7 or 8 numbers in a test where there is no actual score of 7.5?

ment, from the poorest record. This was done because when one bases the order on numerical value of the scores, the 25th percentile in time measurements marks off the superior fourth of the women, while in measurements of per cent. of accuracy, it marks off the inferior fourth. It seemed less confusing to have the poor record always at the same end of the curve and the 25th percentile always refer to the same relative position in excellency of performance.

The percentages of the Grade Group were obtained by adding together the per cents. of each grade, taken separately, and finding their average. This was the method used in computing the per cents. of the total number of the working children and we have employed the same method to make our results comparable. In both instances it was done because the number of individuals differed in the different grades.

The correlations to be found in the text have been obtained uniformly by the formula $\rho = 1 - \frac{\Sigma D^2}{\frac{n(n^2-1)}{6}}$. An identical intermediate rank was given to all individuals having the same score. The value of $r$ was inferred from the value of $\rho$ in terms of the table given on page 168 of Thorndike's "Mental and Social Measurements;" 1913 Edition.

### *Original Records*

The following are the original, individual scores from which the tables and curves have been made, arranged in the order of their merit, with the score indicative of the greatest excellence at the top. When there were a number of individuals with an identical score, the scores have been arbitrarily arranged in the numerical order of the subjects' institution numbers. The smallest number, *i. e., the earliest commitment*, was given first place.[4]

[4] The earliest commitment to whom these tests were given had an institution number of 1702. The numbers given in this study are the last one or two places of the whole number. For instance, from the whole number 1702, 170 was dropped and 2 was the number given. No. 1706 is 6, No. 1710 is 10, etc. Because a few white girls were too ill to be tested while in quarantine

The accuracy scores are readily understood. The index scores are in every case the estimated time, in seconds, that it would take each to perform the task accurately. This index was obtained by dividing the time by the accuracy and multiplying the result by 100.

The break between each ten records has no other significance than to make it easier to consult them for purposes of comparison.

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and because the colored girls were consistently omitted, it was necessary to run beyond No. 1802 to complete a series of one hundred white girls for testing. There were in all twenty-seven omissions, so that the series ends with No. 1829. Those whose numbers are in the eighteen hundreds are numbered as follows: No. 1800 is 100, No. 1802 is 102, etc. The whole series began with 2 (No. 1702) and ended with 129 (No. 1829).

*Standing Height, in Cm.*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 83 | 173.5 | 23 | 159.5 | 70 | 155.0 | 55 | 150.2 |
| 52 | 173.0 | 112 | 159.3 | 26 | 154.6 | 33 | 150.0 |
| 125 | 170.2 | 117 | 159.3 | 129 | 154.5 | 56 | 149.8 |
| 9 | 169.5 | 22 | 159.0 | 8 | 154.0 | 127 | 149.8 |
| 12 | 169.2 | 104 | 158.7 | 57 | 153.5 | 84 | 149.7 |
| 5 | 166.8 | | | 34 | 153.2 | | |
| 39 | 166.8 | 65 | 158.6 | 108 | 153.2 | 7 | 149.0 |
| 2 | 166.0 | 100 | 158.5 | 124 | 153.2 | 128 | 148.9 |
| 66 | 166.0 | 72 | 158.4 | 42 | 153.0 | 73 | 148.0 |
| 71 | 165.5 | 95 | 158.4 | 64 | 153.0 | 94 | 145.6 |
| | | 114 | 158.4 | | | 24 | 144.0 |
| 25 | 165.4 | 123 | 157.8 | 92 | 153.0 | 103 | 141.8 |
| 3 | 165.3 | 97 | 157.5 | 20 | 152.5 | 109 | 140.5 |
| 30 | 165.2 | 122 | 157.5 | 36 | 152.4 | 44 | 138.4 |
| 31 | 165.0 | 111 | 157.4 | 67 | 152.4 | | |
| 85 | 164.5 | 51 | 157.0 | 76 | 152.4 | | |
| 10 | 164.0 | | | 82 | 152.3 | | |
| 69 | 163.0 | 81 | 157.0 | 102 | 152.3 | | |
| 115 | 162.3 | 53 | 156.5 | 16 | 152.0 | | |
| 90 | 162.0 | 74 | 156.5 | 35 | 152.0 | | |
| 32 | 161.5 | 28 | 156.2 | 101 | 152.0 | | |
| | | 40 | 156.0 | | | | |
| 38 | 160.6 | 63 | 156.0 | 14 | 151.6 | | |
| 87 | 160.6 | 13 | 155.6 | 18 | 151.5 | | |
| 93 | 160.2 | 21 | 155.5 | 116 | 151.5 | | |
| 78 | 160.1 | 45 | 155.5 | 106 | 151.4 | | |
| 89 | 159.8 | 29 | 155.0 | 91 | 151.2 | | |

*Weight, in Kg.*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 52 | 101.60 | 34 | 62.95 | 101 | 57.65 | 69 | 51.00 |
| 30 | 79.20 | 87 | 62.25 | 13 | 57.50 | 24 | 49.50 |
| 9 | 78.55 | 82 | 61.95 | 100 | 57.35 | 28 | 48.50 |
| 91 | 78.50 | 64 | 61.85 | 127 | 56.75 | 8 | 48.30 |
| 39 | 76.50 | 12 | 61.55 | 56 | 56.45 | 20 | 47.75 |
| 5 | 75.45 | | | 45 | 56.40 | | |
| 33 | 71.75 | 104 | 61.15 | 63 | 56.10 | 16 | 47.70 |
| 112 | 71.70 | 117 | 61.00 | 92 | 56.00 | 114 | 47.50 |
| 85 | 71.00 | 83 | 60.75 | 51 | 55.50 | 73 | 46.00 |
| 128 | 70.55 | 31 | 60.55 | 89 | 55.25 | 90 | 46.00 |
| | | 124 | 60.50 | | | 67 | 45.00 |
| 71 | 69.95 | 32 | 60.50 | 57 | 54.55 | 84 | 44.00 |
| 2 | 69.20 | 108 | 60.50 | 94 | 54.40 | 21 | 43.65 |
| 65 | 69.15 | 115 | 59.90 | 106 | 53.70 | 44 | 42.50 |
| 76 | 69.00 | 29 | 59.80 | 74 | 53.60 | | |
| 125 | 68.75 | 40 | 59.50 | 129 | 53.60 | | |
| 81 | 66.75 | | | 18 | 53.55 | | |
| 36 | 66.20 | 102 | 59.05 | 7 | 53.00 | | |
| 35 | 65.50 | 53 | 59.00 | 55 | 52.90 | | |
| 3 | 65.45 | 97 | 59.00 | 122 | 52.75 | | |
| 111 | 65.20 | 10 | 58.80 | 78 | 52.75 | | |
| | | 70 | 58.75 | | | | |
| 23 | 64.20 | 123 | 58.45 | 38 | 52.55 | | |
| 66 | 63.75 | 103 | 58.25 | 93 | 52.50 | | |
| 95 | 63.75 | 25 | 58.00 | 109 | 51.75 | | |
| 22 | 63.50 | 72 | 57.85 | 26 | 51.65 | | |
| 116 | 63.00 | 42 | 57.75 | 14 | 51.30 | | |

*Strength of Grip, Right Hand, in Kg.*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 30 | 41.0 | 13 | 30.5 | 91 | 27.0 | 85 | 22.0 |
| 12 | 39.5 | 29 | 30.5 | 122 | 27.0 | 93 | 22.0 |
| 125 | 39.0 | 97 | 30.5 | 123 | 27.0 | 2 | 21.5 |
| 10 | 36.0 | 64 | 30.0 | 70 | 26.5 | 24 | 21.0 |
| 9 | 35.5 | 124 | 30.0 | 78 | 26.5 | 94 | 21.0 |
| 31 | 35.5 | | | 92 | 26.5 | | |
| 52 | 35.5 | 21 | 29.5 | 114 | 26.5 | 127. | 21.0 |
| 5 | 35.0 | 67 | 29.5 | 117 | 26.5 | 103 | 20.5 |
| 18 | 35.0 | 71 | 29.5 | 129 | 26.5 | 74 | 19.5 |
| 34 | 35.0 | 81 | 29.5 | 22 | 26.0 | 95 | 18.5 |
| | | 87 | 29.5 | | | 63 | 18.0 |
| 101 | 34.0 | 112 | 29.5 | 66 | 26.0 | 65 | 17.0 |
| 108 | 34.0 | 116 | 29.5 | 69 | 26.0 | 53 | 15.0 |
| 16 | 33.5 | 7 | 29.0 | 20 | 25.5 | 73 | 9.5 |
| 32 | 33.5 | 35 | 29.0 | 40 | 25.5 | | |
| 45 | 33.0 | 39 | 29.0 | 100 | 25.5 | | |
| 104 | 33.0 | | | 42 | 25.0 | | |
| 89 | 32.5 | 106 | 29.0 | 102 | 25.0 | | |
| 36 | 32.0 | 28 | 28.5 | 115 | 25.0 | | |
| 38 | 32.0 | 57 | 28.5 | 128 | 25.0 | | |
| 76 | 32.0 | 3 | 28.0 | 33 | 24.5 | | |
| | | 8 | 28.0 | | | | |
| 84 | 32.0 | 14 | 28.0 | 56 | 24.0 | | |
| 51 | 31.5 | 25 | 27.5 | 109 | 24.0 | | |
| 82 | 31.0 | 23 | 27.0 | 55 | 23.5 | | |
| 83 | 31.0 | 72 | 27.0 | 26 | 22.0 | | |
| 111 | 31.0 | 90 | 27.0 | 44 | 22.0 | | |

*Strength of Grip, Left Hand, in Kg.*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 30 | 43.0 | 71 | 27.0 | 66 | 24.0 | 103 | 21.0 |
| 9 | 36.0 | 76 | 27.0 | 129 | 24.0 | 115 | 21.0 |
| 89 | 34.5 | 106 | 27.0 | 25 | 23.5 | 128 | 21.0 |
| 108 | 33.0 | 111 | 27.0 | 42 | 23.5 | 26 | 20.5 |
| 5 | 32.0 | 116 | 27.0 | 95 | 23.5 | 63 | 20.5 |
| 31 | 32.0 | | | 97 | 23.0 | | |
| 12 | 31.0 | 13 | 26.5 | 24 | 22.5 | 94 | 20.0 |
| 18 | 31.0 | 28 | 26.5 | 57 | 22.5 | 44 | 19.0 |
| 51 | 31.0 | 67 | 26.5 | 70 | 22.5 | 65 | 19.0 |
| 101 | 31.0 | 92 | 26.5 | 104 | 22.5 | 69 | 18.5 |
| | | 72 | 26.0 | | | 55 | 17.5 |
| 82 | 30.5 | 84 | 26.0 | 33 | 22.0 | 53 | 17.0 |
| 10 | 30.0 | 112 | 26.0 | 74 | 22.0 | 22 | 14.0 |
| 36 | 30.0 | 29 | 25.6 | 78 | 22.0 | 73 | 10.0 |
| 32 | 29.5 | 3 | 25.0 | 85 | 22.0 | | |
| 8 | 29.0 | 16 | 25.0 | 90 | 22.0 | | |
| 52 | 29.0 | | | 91 | 22.0 | | |
| 87 | 29.0 | 56 | 25.0 | 100 | 22.0 | | |
| 14 | 28.5 | 109 | 25.0 | 127 | 22.0 | | |
| 34 | 28.5 | 117 | 25.0 | 20 | 21.5 | | |
| 38 | 28.5 | 123 | 25.0 | 93 | 21.5 | | |
| | | 7 | 24.5 | | | | |
| 83 | 28.5 | 21 | 24.5 | 114 | 21.5 | | |
| 64 | 28.0 | 35 | 24.5 | 122 | 21.5 | | |
| 124 | 28.0 | 40 | 24.5 | 2 | 21.0 | | |
| 125 | 28.0 | 102 | 24.5 | 23 | 21.0 | | |
| 39 | 27.0 | 45 | 24.0 | 81 | 21.0 | | |

*Steadiness of the Hand—Right*

| Subject | Hole | Contacts | Subject | Hole | Contacts | Subject | Hole | Contacts | Subject | Hole | Contacts |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | 9 | 4 | 36 | 7 | 12 | 78 | 6 | 10 | 108 | 4 | 2 |
| 106 | 9 | 12 | 56 | 7 | 12 | 30 | 6 | 11 | 93 | 4 | 3 |
| 12 | 8 | 5 | 84 | 6 | 1 | 102 | 6 | 11 | 22 | 4 | 5 |
| 21 | 8 | 7 | 45 | 6 | 2 | 125 | 6 | 11 | 33 | 4 | 7 |
| 85 | 8 | 8 | 76 | 6 | 2 | 9 | 6 | 12 | 10 | 4 | 8 |
| 34 | 8 | 10 | | | | 55 | 6 | 12 | | | |
| 35 | 8 | 10 | 116 | 6 | 2 | 71 | 6 | 12 | 25 | 3, 2 or 1 | |
| 91 | 8 | 12 | 87 | 6 | 3 | 51 | 5 | 1 | 28 | 3, 2 or 1 | |
| 111 | 7 | 2 | 101 | 6 | 3 | 40 | 5 | 3 | 63 | 3, 2 or 1 | |
| 72 | 7 | 6 | 117 | 6 | 3 | 97 | 5 | 3 | 73 | 3, 2 or 1 | |
| | | | 7 | 6 | 4 | | | | 81 | 3, 2 or 1 | |
| 31 | 7 | 7 | 89 | 6 | 4 | 18 | 5 | 4 | 114 | 3, 2 or 1 | |
| 64 | 7 | 7 | 16 | 6 | 5 | 67 | 5 | 5 | 122 | 3, 2 or 1 | |
| 100 | 7 | 7 | 69 | 6 | 5 | 104 | 5 | 5 | 128 | 3, 2 or 1 | |
| 129 | 7 | 7 | 2 | 6 | 6 | 112 | 5 | 5 | | | |
| 8 | 7 | 8 | 3 | 6 | 6 | 109 | 5 | 6 | | | |
| 13 | 7 | 8 | | | | 38 | 5 | 9 | | | |
| 20 | 7 | 8 | 83 | 6 | 6 | 127 | 5 | 9 | | | |
| 115 | 7 | 8 | 70 | 6 | 7 | 29 | 5 | 11 | | | |
| 24 | 7 | 9 | 95 | 6 | 7 | 42 | 5 | 11 | | | |
| 39 | 7 | 9 | 124 | 6 | 7 | 65 | 5 | 11 | | | |
| | | | 103 | 6 | 8 | | | | | | |
| 82 | 7 | 9 | 74 | 6 | 9 | 92 | 5 | 11 | | | |
| 53 | 7 | 10 | 5 | 6 | 10 | 94 | 5 | 11 | | | |
| 32 | 7 | 11 | 26 | 6 | 10 | 123 | 5 | 11 | | | |
| 44 | 7 | 11 | 52 | 6 | 10 | 66 | 5 | 12 | | | |
| 23 | 7 | 12 | 57 | 6 | 10 | 90 | 5 | 12 | | | |

*Tapping—Number of Taps in 30"—Right Hand*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 117 | 235 | 5 | 178 | 125 | 153 | 74 | 95 |
| 71 | 210 | 28 | 178 | 34 | 152 | 109 | 90 |
| 9 | 198 | 72 | 177 | 44 | 152 | 55 | 83 |
| 26 | 196 | 89 | 175 | 114 | 149 | 23 | 73 |
| 3 | 195 | 102 | 175 | 24 | 145 | 73 | 72 |
| 31 | 195 | | | 115 | 142 | | |
| 78 | 195 | 106 | 175 | 21 | 140 | 38 | 71 |
| 94 | 192 | 7 | 174 | 18 | 139 | 39 | 65 |
| 100 | 192 | 81 | 174 | 52 | 137 | 116 | 65 |
| 76 | 190 | 30 | 170 | 92 | 137 | 123 | 65 |
| | | 69 | 169 | | | 65 | 63 |
| 112 | 188 | 91 | 166 | 22 | 134 | 64 | 62 |
| 82 | 186 | 42 | 165 | 20 | 130 | 127 | 57 |
| 87 | 186 | 70 | 165 | 8 | 129 | 108 | 24 |
| 16 | 185 | 85 | 165 | 101 | 126 | | |
| 45 | 185 | 57 | 164 | 40 | 125 | | |
| 51 | 185 | | | 63 | 121 | | |
| 84 | 185 | 29 | 160 | 56 | 120 | | |
| 93 | 185 | 33 | 160 | 14 | 119 | | |
| 67 | 184 | 103 | 160 | 104 | 116 | | |
| 111 | 183 | 122 | 160 | 2 | 115 | | |
| | | 13 | 158 | | | | |
| 12 | 182 | 25 | 157 | 124 | 112 | | |
| 129 | 182 | 36 | 157 | 95 | 103 | | |
| 66 | 180 | 83 | 156 | 35 | 102 | | |
| 90 | 180 | 128 | 155 | 10 | 101 | | |
| 97 | 180 | 32 | 153 | 53 | 100 | | |

*Tapping—Number of Taps in 60"—Right Hand*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 117 | 452 | 106 | 344 | 25 | 295 | 109 | 204 |
| 71 | 401 | 28 | 342 | 24 | 291 | 53 | 197 |
| 26 | 393 | 66 | 340 | 115 | 290 | 74 | 172 |
| 112 | 393 | 72 | 337 | 128 | 290 | 38 | 162 |
| 100 | 382 | 97 | 335 | 52 | 289 | 73 | 158 |
| 3 | 377 | | | 42 | 286 | | |
| 31 | 375 | 102 | 333 | 18 | 272 | 123 | 152 |
| 12 | 371 | 70 | 332 | 8 | 271 | 23 | 149 |
| 84 | 371 | 81 | 328 | 22 | 270 | 116 | 149 |
| 45 | 370 | 30 | 327 | 92 | 270 | 64 | 145 |
| | | 69 | 326 | | | 65 | 145 |
| 9 | 368 | 125 | 325 | 14 | 260 | 39 | 135 |
| 76 | 365 | 5 | 324 | 21 | 260 | 127 | 111 |
| 78 | 365 | 122 | 324 | 114 | 258 | 108 | 48 |
| 51 | 364 | 7 | 319 | 2 | 254 | | |
| 111 | 362 | 33 | 318 | 40 | 254 | | |
| 129 | 362 | | | 101 | 252 | | |
| 67 | 355 | 57 | 317 | 124 | 251 | | |
| 87 | 355 | 83 | 317 | 20 | 246 | | |
| 93 | 355 | 91 | 315 | 63 | 245 | | |
| 94 | 355 | 103 | 315 | 4 | 243 | | |
| | | 13 | 305 | | | | |
| 82 | 352 | 29 | 305 | 56 | 242 | | |
| 90 | 350 | 44 | 303 | 35 | 224 | | |
| 89 | 348 | 34 | 302 | 95 | 220 | | |
| 32 | 346 | 85 | 302 | 10 | 209 | | |
| 16 | 345 | 36 | 300 | 55 | 204 | | |

*Tapping—Number of Taps in 30"—Left Hand*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 117 | 208 | 83 | 160 | 8 | 139 | 63 | 108 |
| 76 | 185 | 93 | 160 | 25 | 138 | 35 | 106 |
| 112 | 182 | 14 | 159 | 115 | 137 | 21 | 103 |
| 32 | 180 | 45 | 159 | 29 | 136 | 22 | 102 |
| 72 | 180 | 70 | 158 | 128 | 134 | 30 | 102 |
| 111 | 180 | | | 104 | 133 | | |
| 13 | 179 | 91 | 158 | 57 | 132 | 23 | 93 |
| 100 | 179 | 102 | 157 | 34 | 131 | 74 | 93 |
| 85 | 176 | 28 | 155 | 97 | 130 | 127 | 93 |
| 31 | 175 | 3 | 154 | 101 | 130 | 64 | 88 |
| | | 2 | 153 | | | 39 | 85 |
| 71 | 175 | 109 | 152 | 53 | 129 | 116 | 85 |
| 129 | 171 | 7 | 151 | 12 | 127 | 73 | 78 |
| 26 | 170 | 81 | 150 | 56 | 127 | 108 | 20 |
| 95 | 170 | 89 | 150 | 20 | 125 | | |
| 106 | 170 | 122 | 150 | 90 | 125 | | |
| 125 | 168 | | | 65 | 124 | | |
| 84 | 167 | 103 | 149 | 114 | 122 | | |
| 87 | 167 | 94 | 148 | 18 | 118 | | |
| 51 | 165 | 42 | 147 | 123 | 118 | | |
| 52 | 165 | 55 | 147 | 36 | 117 | | |
| | | 24 | 146 | | | | |
| 5 | 162 | 69 | 145 | 10 | 115 | | |
| 82 | 162 | 9 | 144 | 16 | 115 | | |
| 33 | 161 | 66 | 142 | 38 | 114 | | |
| 67 | 160 | 44 | 140 | 124 | 112 | | |
| 78 | 160 | 92 | 140 | 40 | 111 | | |

*Tapping—Number of Taps in 60"—Left Hand*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 117 | 413 | 67 | 307 | 101 | 268 | 63 | 210 |
| 112 | 355 | 33 | 305 | 104 | 267 | 21 | 203 |
| 76 | 348 | 93 | 302 | 115 | 267 | 35 | 202 |
| 111 | 342 | 5 | 300 | 29 | 265 | 127 | 200 |
| 95 | 335 | 28 | 298 | 128 | 265 | 22 | 195 |
| 72 | 332 | | | 24 | 264 | | |
| 129 | 332 | 3 | 297 | 25 | 264 | 116 | 188 |
| 125 | 330 | 102 | 293 | 81 | 260 | 23 | 185 |
| 100 | 329 | 109 | 292 | 97 | 260 | 74 | 185 |
| 13 | 328 | 89 | 290 | 12 | 255 | 64 | 182 |
| | | 122 | 290 | | | 39 | 180 |
| 31 | 325 | 7 | 289 | 57 | 255 | 73 | 155 |
| 32 | 325 | 70 | 287 | 123 | 255 | 20 | 152 |
| 85 | 325 | 55 | 286 | 90 | 246 | 108 | 43 |
| 106 | 323 | 91 | 285 | 56 | 236 | | |
| 51 | 322 | 103 | 285 | 65 | 235 | | |
| 84 | 322 | | | 38 | 233 | | |
| 52 | 321 | 2 | 284 | 53 | 232 | | |
| 14 | 320 | 34 | 282 | 114 | 231 | | |
| 71 | 320 | 92 | 282 | 40 | 230 | | |
| 26 | 319 | 94 | 282 | 36 | 226 | | |
| | | 9 | 280 | | | | |
| 83 | 317 | 42 | 277 | 16 | 225 | | |
| 87 | 315 | 8 | 275 | 124 | 223 | | |
| 78 | 312 | 44 | 275 | 10 | 220 | | |
| 45 | 311 | 69 | 273 | 18 | 220 | | |
| 82 | 310 | 66 | 270 | 30 | 216 | | |

*Tapping—Index of Fatigue—Right Hand*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 42 | 40.0 | 3 | 10.2 | 103 | 0.0 | 108 | —26.7 |
| 114 | 36.8 | 69 | 9.4 | 108 | 0.0 | 10 | —31.7 |
| 94 | 34.0 | 76 | 9.2 | 111 | 0.0 | 16 | —33.3 |
| 74 | 30.0 | 117 | 8.3 | 129 | 0.0 | 52 | —40.0 |
| 85 | 28.0 | 112 | 8.0 | 84 | —1.1 | 125 | —40.0 |
| 9 | 20.2 | | | 122 | —1.3 | | |
| 7 | 16.7 | 18 | 7.9 | 44 | —1.4 | 32 | —40.6 |
| 66 | 16.7 | 90 | 7.6 | 87 | —2.4 | 116 | —46.7 |
| 128 | 16.3 | 57 | 7.2 | 73 | —2.5 | 64 | —48.2 |
| 81 | 15.6 | 92 | 7.1 | 63 | —3.3 | 38 | —50.0 |
| | | 100 | 6.1 | | | 123 | —53.2 |
| 102 | 14.6 | 30 | 5.7 | 83 | —4.0 | 2 | —53.3 |
| 29 | 14.5 | 12 | 5.6 | 101 | —4.9 | 124 | —59.5 |
| 72 | 14.4 | 51 | 5.3 | 70 | —5.5 | 55 | —63.2 |
| 21 | 14.3 | 26 | 5.0 | 115 | —7.1 | | |
| 82 | 13.9 | 31 | 5.0 | 127 | —7.4 | | |
| 25 | 13.8 | | | 56 | —8.8 | | |
| 28 | 13.7 | 106 | 4.5 | 40 | —10.4 | | |
| 67 | 13.1 | 22 | 4.3 | 23 | —13.9 | | |
| 78 | 13.0 | 34 | 3.9 | 95 | —16.0 | | |
| 5 | 12.9 | 24 | 2.8 | 39 | —16.7 | | |
| | | 33 | 2.3 | | | | |
| 91 | 12.8 | 89 | 2.3 | 8 | —16.9 | | |
| 71 | 12.7 | 97 | 2.3 | 104 | —17.8 | | |
| 36 | 12.5 | 53 | 2.0 | 35 | —19.2 | | |
| 93 | 12.4 | 20 | 1.8 | 14 | —19.7 | | |
| 13 | 11.8 | 45 | 0.0 | 65 | —20.0 | | |

*Tapping—Index of Fatigue—Left Hand*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 70 | 32.2 | 18 | 15.8 | 129 | 9.2 | 12 | — 4.6 |
| 22 | 31.0 | 82 | 15.3 | 9 | 8.9 | 20 | — 4.7 |
| 87 | 27.9 | 94 | 15.2 | 45 | 8.4 | 40 | — 5.2 |
| 91 | 27.1 | 67 | 14.8 | 65 | 8.3 | 101 | — 7.4 |
| 81 | 26.8 | 106 | 14.4 | 114 | 8.1 | 34 | — 8.8 |
| 72 | 25.0 | | | 112 | 8.0 | | |
| 5 | 23.6 | 26 | 14.0 | 73 | 7.5 | 38 | —13.0 |
| 53 | 23.1 | 25 | 13.5 | 111 | 7.5 | 74 | —14.8 |
| 100 | 22.9 | 122 | 13.0 | 83 | 7.3 | 123 | —18.2 |
| 56 | 22.1 | 35 | 12.7 | 8 | 6.9 | 64 | —21.4 |
| | | 103 | 12.7 | | | 39 | —23.8 |
| 69 | 20.3 | 13 | 12.2 | 95 | 5.9 | 127 | —27.9 |
| 32 | 20.2 | 10 | 12.1 | 21 | 5.6 | 108 | —30.0 |
| 102 | 20.0 | 78 | 11.8 | 52 | 5.0 | 116 | —32.5 |
| 42 | 19.5 | 85 | 11.8 | 55 | 4.2 | | |
| 16 | 19.1 | 57 | 11.7 | 31 | 2.4 | | |
| 76 | 18.2 | | | 30 | 1.8 | | |
| 36 | 17.7 | 51 | 11.5 | 24 | 1.1 | | |
| 33 | 17.6 | 128 | 11.4 | 117 | 0.9 | | |
| 66 | 17.3 | 29 | 11.1 | 14 | 0.0 | | |
| 2 | 17.1 | 90 | 10.3 | 97 | 0.0 | | |
| | | 63 | 10.2 | | | | |
| 71 | 16.7 | 7 | 10.1 | 104 | 0.0 | | |
| 3 | 16.5 | 125 | 9.8 | 109 | 0.0 | | |
| 28 | 16.5 | 115 | 9.7 | 124 | 0.0 | | |
| 93 | 16.5 | 44 | 9.3 | 23 | —2.2 | | |
| 89 | 15.9 | 84 | 9.3 | 92 | —2.9 | | |

*Card Sorting Test—Index*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 78 | 33.5 | 82 | 39.7 | 26 | 44.2 | 5 | 55.8 |
| 93 | 34.0 | 28 | 39.8 | 117 | 44.3 | 122 | 56.8 |
| 23 | 34.3 | 29 | 39.8 | 14 | 44.4 | 20 | 57.8 |
| 125 | 34.6 | 106 | 39.8 | 52 | 44.6 | 35 | 62.6 |
| 66 | 34.8 | 72 | 40.0 | 124 | 47.0 | 128 | 63.2 |
| 109 | 35.0 | | | 25 | 47.6 | | |
| 9 | 35.3 | 12 | 40.2 | 103 | 49.0 | 81 | 63.9 |
| 97 | 35.5 | 31 | 40.2 | 36 | 49.2 | 24 | 64.7 |
| 16 | 35.8 | 92 | 40.4 | 64 | 49.6 | 127 | 65.4 |
| 76 | 35.8 | 69 | 40.6 | 115 | 49.8 | 22 | 65.6 |
| | | 123 | 40.8 | | | 65 | 68.3 |
| 71 | 36.8 | 40 | 40.9 | 38 | 50.0 | 108 | 86.4 |
| 101 | 36.8 | 51 | 41.0 | 42 | 50.0 | 74 | 92.1 |
| 94 | 37.2 | 55 | 41.0 | 87 | 50.0 | 116 | 108.9 |
| 90 | 37.3 | 84 | 41.0 | 39 | 50.8 | | |
| 32 | 37.6 | 112 | 41.6 | 53 | 51.0 | | |
| 45 | 37.8 | | | 7 | 51.3 | | |
| 13 | 38.0 | 102 | 41.7 | 73 | 52.1 | | |
| 63 | 38.0 | 30 | 41.8 | 111 | 52.2 | | |
| 129 | 38.0 | 8 | 41.9 | 21 | 53.3 | | |
| 34 | 38.2 | 67 | 42.0 | 104 | 53.6 | | |
| | | 100 | 42.0 | | | | |
| 95 | 38.2 | 18 | 42.3 | 3 | 53.7 | | |
| 114 | 38.6 | 56 | 42.6 | 85 | 53.7 | | |
| 70 | 38.8 | 10 | 42.8 | 91 | 54.6 | | |
| 83 | 39.6 | 44 | 43.1 | 33 | 54.7 | | |
| 89 | 39.6 | 57 | 43.8 | 2 | 54.8 | | |

*Card Sorting Test—Per cent. of Accuracy*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 93 | 100 | 112 | 100 | 78 | 97.9 | 18 | 95.8 |
| 125 | 100 | 30 | 100 | 23 | 97.9 | 111 | 95.8 |
| 66 | 100 | 67 | 100 | 9 | 97.9 | 85 | 95.8 |
| 109 | 100 | 100 | 100 | 71 | 97.9 | 33 | 95.8 |
| 16 | 100 | 56 | 100 | 90 | 97.9 | 122 | 95.8 |
| 76 | 100 | | | 34 | 97.9 | | |
| 101 | 100 | 10 | 100 | 114 | 97.9 | 81 | 95.8 |
| 94 | 100 | 57 | 100 | 82 | 97.9 | 24 | 95.8 |
| 32 | 100 | 26 | 100 | 28 | 97.9 | 21 | 93.8 |
| 45 | 100 | 14 | 100 | 29 | 97.9 | 7 | 91.7 |
| | | 52 | 100 | | | 20 | 89.6 |
| 13 | 100 | 124 | 100 | 40 | 97.9 | 65 | 89.6 |
| 63 | 100 | 25 | 100 | 123 | 97.9 | 74 | 83.3 |
| 129 | 100 | 103 | 100 | 102 | 97.9 | 5 | 81.3 |
| 95 | 100 | 36 | 100 | 8 | 97.9 | | |
| 83 | 100 | 64 | 100 | 44 | 97.9 | | |
| 89 | 100 | | | 117 | 97.9 | | |
| 106 | 100 | 38 | 100 | 115 | 97.9 | | |
| 72 | 100 | 42 | 100 | 87 | 97.9 | | |
| 12 | 100 | 39 | 100 | 73 | 97.9 | | |
| 31 | 100 | 53 | 100 | 3 | 97.9 | | |
| | | 104 | 100 | | | | |
| 92 | 100 | 91 | 100 | 127 | 97.9 | | |
| 69 | 100 | 2 | 100 | 108 | 97.9 | | |
| 51 | 100 | 35 | 100 | 116 | 97.9 | | |
| 55 | 100 | 128 | 100 | 97 | 95.8 | | |
| 84 | 100 | 22 | 100 | 70 | 95.8 | | |

*Cancellation "a" Test*

Per cent. of Accuracy with Ranks for Each Accuracy Arranged in Order of Time

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 21 | 100 | 115 | 96 | 34 | 88 | 57 | 62 |
| 106 | 100 | 73 | 96 | 14 | 88 | 38 | 62 |
| 32 | 100 | 82 | 96 | 53 | 88 | 104 | 62 |
| 71 | 100 | 85 | 96 | 51 | 86 | 114 | 59.60 |
| 55 | 100 | 18 | 96 | 76 | 86 | 20 | 50 |
| 78 | 100 | | | 29 | 84 | | |
| 129 | 100 | 91 | 96 | 40 | 84 | 42 | 48 |
| 23 | 98 | 7 | 94.12 | 102 | 84 | 127 | 46 |
| 45 | 98 | 13 | 94 | 97 | 82 | 24 | 40 |
| 125 | 98 | 25 | 94 | 56 | 82 | 81 | 36 |
| | | 84 | 94 | | | 122 | 34 |
| 28 | 98 | 83 | 94 | 5 | 82 | 108 | Failure |
| 69 | 98 | 63 | 92 | 35 | 82 | 128 | Failure |
| 30 | 98 | 16 | 92 | 94 | 80 | 116 | Failure |
| 117 | 98 | 52 | 92 | 2 | 80 | | |
| 66 | 98 | 70 | 92 | 92 | 80 | | |
| 100 | 98 | | | 39 | 78 | | |
| 111 | 98 | 95 | 92 | 26 | 78 | | |
| 22 | 98 | 10 | 92 | 74 | 76 | | |
| 12 | 98 | 3 | 92 | 9 | 75.47 | | |
| 89 | 98 | 123 | 90 | 33 | 74 | | |
| | | 90 | 90 | | | | |
| 64 | 98 | 87 | 90 | 124 | 74 | | |
| 103 | 98 | 44 | 90 | 36 | 72 | | |
| 8 | 96 | 112 | 90 | 67 | 68 | | |
| 72 | 96 | 65 | 90 | 101 | 66 | | |
| 31 | 96 | 109 | 88 | 93 | 64 | | |

*Cancellation "a" Test—Index*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 9 | 102.3 | 55 | 190.0 | 82 | 236.3 | 103 | 361.0 |
| 23 | 120.4 | 123 | 192.2 | 111 | 238.8 | 104 | 370.2 |
| 21 | 127.4 | 90 | 192.7 | 14 | 239.5 | 122 | 379.5 |
| 63 | 133.8 | 117 | 193.5 | 5 | 241.7 | 65 | 396.4 |
| 45 | 140.6 | 66 | 193.9 | 12 | 241.8 | 127 | 458.9 |
| 16 | 141.7 | | | 22 | 241.8 | | |
| 32 | 142.0 | 67 | 194.1 | 44 | 247.1 | 91 | 467.7 |
| 106 | 142.0 | 36 | 194.7 | 33 | 247.3 | 24 | 472.5 |
| 125 | 154.6 | 95 | 195.7 | 2 | 247.8 | 81 | 481.1 |
| 71 | 156.0 | 34 | 199.1 | 84 | 255.3 | 114 | 553.7 |
| | | 76 | 199.3 | | | 20 | 610.4 |
| 52 | 157.8 | 25 | 199.6 | 92 | 262.5 | 108 | Failure |
| 39 | 162.1 | 78 | 200.0 | 124 | 262.7 | 116 | Failure |
| 28 | 162.2 | 94 | 200.3 | 57 | 266.1 | 128 | Failure |
| 29 | 163.1 | 100 | 201.0 | 102 | 268.1 | | |
| 97 | 163.4 | 51 | 207.7 | 93 | 293.8 | | |
| 101 | 163.9 | | | 85 | 295.9 | | |
| 13 | 164.7 | 31 | 210.4 | 89 | 298.0 | | |
| 69 | 168.2 | 87 | 210.7 | 112 | 300.0 | | |
| 70 | 168.9 | 10 | 210.9 | 83 | 301.1 | | |
| 26 | 169.0 | 115 | 221.3 | 35 | 303.7 | | |
| | | 56 | 223.2 | | | | |
| 30 | 169.8 | 129 | 228.0 | 42 | 322.9 | | |
| 8 | 171.9 | 3 | 230.7 | 64 | 330.2 | | |
| 109 | 173.6 | 73 | 231.3 | 18 | 336.7 | | |
| 72 | 184.4 | 7 | 233.3 | 38 | 337.0 | | |
| 74 | 189.5 | 40 | 235.3 | 53 | 355.9 | | |

*Memory Span—Number of Digits Recalled*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 3 | 9* | 89 | 8 | 103 | 7 | 91 | 5 |
| 5 | 9 | 90 | 8 | 109 | 7* | 93 | 5 |
| 23 | 9 | 100 | 8 | 114 | 7 | 115 | 5 |
| 26 | 9 | 106 | 8* | 117 | 7 | 18 | 4 |
| 30 | 9 | 111 | 8 | 124 | 7 | 35 | 4 |
| 31 | 9 | | | 8 | 6 | | |
| 32 | 9 | 112 | 8 | 9 | 6 | 44 | 4 |
| 45 | 9 | 123 | 8 | 14 | 6 | 56 | 4 |
| 63 | 9 | 7 | 7 | 36 | 6 | 104 | 4 |
| 66 | 9 | 12 | 7 | 51 | 6 | 108 | 4 |
| | | 13 | 7 | | | 42 | 4— |
| 71 | 9 | 34 | 7 | 97 | 6 | 64 | 4— |
| 72 | 9 | 39 | 7 | 127 | 6 | 116 | 4— |
| 83 | 9 | 52 | 7 | 20 | 5 | 128 | 4— |
| 85 | 9* | 55 | 7 | 21 | 5 | | |
| 102 | 9 | 69 | 7 | 22 | 5 | | |
| 122 | 9* | | | 24 | 5 | | |
| 125 | 9* | 73 | 7 | 29 | 5 | | |
| 129 | 9* | 76 | 7 | 33 | 5 | | |
| 2 | 8 | 78 | 7 | 38 | 5 | | |
| 10 | 8 | 82 | 7 | 40 | 5 | | |
| | | 84 | 7 | | | | |
| 16 | 8 | 87 | 7* | 53 | 5 | | |
| 25 | 8 | 92 | 7 | 65 | 5 | | |
| 28 | 8 | 94 | 7 | 70 | 5 | | |
| 57 | 8 | 95 | 7 | 74 | 5 | | |
| 67 | 8 | 101 | 7 | 81 | 5 | | |

* Those starred recalled one or both of two ten place number series.

*Per Cent. of Seven Numbers Recalled*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 3 | 100 | 117 | 100 | 39 | 78.6 | 127 | 50 0 |
| 5 | 100 | 122 | 100 | 89 | 78.6 | 14 | 46.5 |
| 12 | 100 | 123 | 100 | 93 | 78.6 | 56 | 46.5 |
| 13 | 100 | 125 | 100 | 103 | 78.6 | 74 | 46.5 |
| 23 | 100 | 55 | 92.9 | 8 | 75.0 | 24 | 39.8 |
| 25 | 100 | | | 30 | 75.0 | | |
| 26 | 100 | 57 | 92.9 | 73 | 75.0 | 64 | 39.3 |
| 28 | 100 | 78 | 92.9 | 92 | 75.0 | 53 | 35.8 |
| 31 | 100 | 85 | 92.9 | 114 | 75.0 | 42 | 32 0 |
| 32 | 100 | 87 | 92.9 | 91 | 71.5 | 35 | 30.0 |
| | | 109 | 92.9 | | | 18 | 21.5 |
| 45 | 100 | 111 | 92.9 | 102 | 71.5 | 104 | 14.3 |
| 52 | 100 | 124 | 92.9 | 129 | 71.5 | 116 | 7.2 |
| 66 | 100 | 16 | 89.3 | 81 | 71.4 | 128 | Failure |
| 71 | 100 | 67 | 89.3 | 108 | 71.4 | | |
| 72 | 100 | 2 | 85.7 | 29 | 64.3 | | |
| 76 | 100 | | | 22 | 60.7 | | |
| 82 | 100 | 9 | 85.7 | 33 | 60.7 | | |
| 83 | 100 | 36 | 85.7 | 65 | 57.2 | | |
| 84 | 100 | 51 | 85.7 | 20 | 53.6 | | |
| 90 | 100 | 63 | 85.7 | 38 | 53.6 | | |
| | | 69 | 85.7 | | | | |
| 94 | 100 | 95 | 85.7 | 40 | 53.6 | | |
| 100 | 100 | 97 | 82.2 | 44 | 53.6 | | |
| 101 | 100 | 7 | 78.6 | 21 | 50.0 | | |
| 106 | 100 | 10 | 78.6 | 70 | 50.0 | | |
| 112 | 100 | 34 | 78.6 | 115 | 50.0 | | |

*Per Cent. of Eight Numbers Recalled*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 3 | 100 | 28 | 81.3 | 114 | 62.5 | 38 | 31.3 |
| 23 | 100 | 97 | 81.3 | 5 | 59.4 | 64 | 31.3 |
| 25 | 100 | 109 | 81.3 | 30 | 59.4 | 70 | 31.3 |
| 26 | 100 | 63 | 78.2 | 34 | 59.4 | 127 | 31.3 |
| 31 | 100 | 90 | 78.2 | 36 | 59.4 | 74 | 28.2 |
| 45 | 100 | | | 21 | 56.3 | | |
| 57 | 100 | 69 | 75.0 | 24 | 56.3 | 115 | 28.2 |
| 100 | 100 | 72 | 75.0 | 29 | 56.3 | 22 | 25.2 |
| 102 | 100 | 83 | 75 0 | 78 | 56.3 | 53 | 25.0 |
| 106 | 100 | 92 | 75.0 | 9 | 53.2 | 104 | 25.0 |
| | | 2 | 71.9 | | | 35 | 12.6 |
| 125 | 100 | 85 | 71.9 | 71 | 53.2 | 108 | 6.3 |
| 129 | 100 | 112 | 71.9 | 56 | 46.9 | 116 | Failure |
| 32 | 93.8 | 10 | 68.8 | 65 | 46.9 | 128 | Failure |
| 122 | 93.8 | 14 | 68.8 | 73 | 46.9 | | |
| 123 | 93.8 | 87 | 68.8 | 81 | 46.9 | | |
| 67 | 90.7 | | | 101 | 46.9 | | |
| 16 | 87.5 | 124 | 68.8 | 8 | 43.8 | | |
| 52 | 87.5 | 12 | 65.7 | 18 | 43.8 | | |
| 55 | 87.5 | 93 | 65.7 | 40 | 43.8 | | |
| 66 | 87.5 | 95 | 65.7 | 20 | 40.7 | | |
| | | 103 | 65.7 | | | | |
| 76 | 87.5 | 117 | 65.7 | 44 | 40.7 | | |
| 89 | 87.5 | 39 | 62.6 | 82 | 40.7 | | |
| 94 | 87.5 | 13 | 62.5 | 91 | 40.7 | | |
| 111 | 87.5 | 51 | 62.5 | 33 | 34.4 | | |
| 7 | 84.4 | 84 | 62.5 | 42 | 34.4 | | |

*Per Cent. of Nine Numbers Recalled*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 3 | 100 | 52 | 75.0 | 55 | 55.6 | 18 | 27.8 |
| 23 | 100 | 83 | 75.0 | 103 | 55.6 | 22 | 27.8 |
| 26 | 100 | 84 | 75.0 | 9 | 52.8 | 53 | 27.8 |
| 125 | 100 | 94 | 75.0 | 14 | 52.8 | 20 | 22.2 |
| 129 | 100 | 72 | 72.2 | 24 | 52.8 | 104 | 22.2 |
| 5 | 94.5 | | | 32 | 50.0 | | |
| 66 | 94.5 | 76 | 72.2 | 33 | 50.0 | 42 | 19.5 |
| 71 | 94.5 | 89 | 72.2 | 36 | 50.0 | 64 | 19.5 |
| 122 | 94.5 | 97 | 72.2 | 40 | 50.0 | 124. | 19.5 |
| 45 | 91.7 | 13 | 69.5 | 95 | 50.0 | 108 | 16.6 |
| | | 90 | 69.5 | | | 35 | 13.9 |
| 63 | 91.7 | 93 | 69.5 | 29 | 47.2 | 74 | 8.4 |
| 31 | 86.1 | 123 | 69.5 | 44 | 47.2 | 116 | Failure |
| 106 | 86.1 | 34 | 66.7 | 127 | 47.2 | 128 | Failure |
| 7 | 83.4 | 69 | 66.7 | 100 | 44.5 | | |
| 16 | 83.4 | 111 | 66.7 | 101 | 44.5 | | |
| 25 | 83.4 | | | 2 | 41.7 | | |
| 67 | 83.4 | 30 | 63.9 | 10 | 38.9 | | |
| 82 | 83.4 | 51 | 63.9 | 81 | 38.9 | | |
| 109 | 80.6 | 114 | 63.9 | 91 | 38.9 | | |
| 12 | 77.8 | 21 | 61.2 | 8 | 36.2 | | |
| | | 112 | 61.2 | | | | |
| 57 | 77.8 | 73 | 61.1 | 87 | 33.4 | | |
| 78 | 77.8 | 28 | 58.4 | 38 | 33.3 | | |
| 85 | 77.8 | 70 | 58.4 | 115 | 33.3 | | |
| 92 | 77.8 | 117 | 58.4 | 56 | 30.6 | | |
| 102 | 77.8 | 39 | 55.6 | 65 | 30.6 | | |

*Substitution Test—Accuracy in Per Cent. Page I*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 5 | 100 | 90 | 100 | 83 | 96 | 102 | 88 |
| 7 | 100 | 94 | 100 | 108 | 96 | 52 | 82 |
| 8 | 100 | 95 | 100 | 115 | 96 | 124 | 82 |
| 9 | 100 | 97 | 100 | 10 | 94 | 65 | 80 |
| 13 | 100 | 103 | 100 | 14 | 94 | 78 | 78 |
| 21 | 100 | | | 36 | 94 | | |
| 22 | 100 | 106 | 100 | 38 | 94 | 114 | 76 |
| 24 | 100 | 112 | 100 | 39 | 94 | 44 | 74 |
| 25 | 100 | 123 | 100 | 42 | 94 | 127 | 64 |
| 26 | 100 | 125 | 100 | 51 | 94 | 35 | 60 |
| | | 3 | 98 | | | 104 | 54 |
| 28 | 100 | 12 | 98 | 53 | 94 | 70 | 52 |
| 29 | 100 | 16 | 98 | 63 | 94 | 116 | Failure |
| 30 | 100 | 40 | 98 | 67 | 94 | 128 | Failure |
| 31 | 100 | 87 | 98 | 93 | 94 | | |
| 32 | 100 | 89 | 98 | 101 | 94 | | |
| 33 | 100 | | | 81 | 92 | | |
| 34 | 100 | 100 | 98 | 20 | 90 | | |
| 45 | 100 | 109 | 98 | 23 | 90 | | |
| 55 | 100 | 117 | 98 | 56 | 90 | | |
| 64 | 100 | 122 | 98 | 92 | 90 | | |
| | | 129 | 98 | | | | |
| 66 | 100 | 2 | 96 | 111 | 90 | | |
| 71 | 100 | 18 | 96 | 74 | 88 | | |
| 72 | 100 | 57 | 96 | 82 | 88 | | |
| 73 | 100 | 69 | 96 | 85 | 88 | | |
| 84 | 100 | 76 | 96 | 91 | 88 | | |

*Substitution Test—Accuracy in Per Cent. Page II*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 2 | 100 | 84 | 100 | 101 | 98 | 85 | 92 |
| 7 | 100 | 87 | 100 | 111 | 98 | 56 | 90 |
| 9 | 100 | 89 | 100 | 114 | 98 | 102 | 90 |
| 10 | 100 | 90 | 100 | 117 | 98 | 65 | 88 |
| 12 | 100 | 94 | 100 | 122 | 98 | 127 | 84 |
| 13 | 100 | | | 123 | 98 | | |
| 14 | 100 | 95 | 100 | 125 | 98 | 70 | 78 |
| 16 | 100 | 103 | 100 | 3 | 96 | 78 | 76 |
| 18 | 100 | 108 | 100 | 5 | 96 | 44 | 72 |
| 22 | 100 | 109 | 100 | 24 | 96 | 52 | 66 |
| | | 112 | 100 | | | 104 | 64 |
| 23 | 100 | 124 | 100 | 29 | 96 | 35 | 50 |
| 25 | 100 | 129 | 100 | 38 | 96 | 116 | Failure |
| 28 | 100 | 8 | 98 | 39 | 96 | 128 | Failure |
| 31 | 100 | 21 | 98 | 53 | 96 | | |
| 32 | 100 | 26 | 98 | 63 | 96 | | |
| 33 | 100 | | | 67 | 96 | | |
| 34 | 100 | 36 | 98 | 91 | 96 | | |
| 40 | 100 | 42 | 98 | 92 | 96 | | |
| 51 | 100 | 45 | 98 | 20 | 94 | | |
| 55 | 100 | 64 | 98 | 30 | 94 | | |
| | | 66 | 98 | | | | |
| 57 | 100 | 69 | 98 | 74 | 94 | | |
| 71 | 100 | 83 | 98 | 76 | 94 | | |
| 72 | 100 | 93 | 98 | 106 | 94 | | |
| 73 | 100 | 97 | 98 | 115 | 94 | | |
| 82 | 100 | 100 | 98 | 81 | 92 | | |

*Substitution Test—Accuracy in Per Cent. Page III*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 3 | 100 | 72 | 100 | 33 | 98 | 103 | 94 |
| 7 | 100 | 73 | 100 | 36 | 98 | 52 | 92 |
| 10 | 100 | 82 | 100 | 38 | 98 | 67 | 92 |
| 12 | 100 | 83 | 100 | 40 | 98 | 111 | 92 |
| 13 | 100 | 85 | 100 | 63 | 98 | 127 | 92 |
| 14 | 100 | | | 84 | 98 | | |
| 16 | 100 | 87 | 100 | 92 | 98 | 53 | 90 |
| 18 | 100 | 89 | 100 | 95 | 98 | 56 | 86 |
| 22 | 100 | 90 | 100 | 108 | 98 | 102 | 86 |
| 24 | 100 | 91 | 100 | 112 | 98 | 104 | 74 |
| | | 94 | 100 | | | 44 | 70 |
| 25 | 100 | 100 | 100 | 115 | 98 | 35 | 44 |
| 26 | 100 | 101 | 100 | 117 | 98 | 116 | Failure |
| 28 | 100 | 106 | 100 | 125 | 98 | 128 | Failure |
| 31 | 100 | 109 | 100 | 20 | 96 | | |
| 32 | 100 | 114 | 100 | 64 | 96 | | |
| 34 | 100 | | | 65 | 96 | | |
| 39 | 100 | 123 | 100 | 74 | 96 | | |
| 42 | 100 | 124 | 100 | 81 | 96 | | |
| 45 | 100 | 129 | 100 | 93 | 96 | | |
| 51 | 100 | 2 | 98 | 97 | 96 | | |
| | | 5 | 98 | | | | |
| 55 | 100 | 8 | 98 | 122 | 96 | | |
| 57 | 100 | 9 | 98 | 21 | 94 | | |
| 66 | 100 | 23 | 98 | 70 | 94 | | |
| 69 | 100 | 29 | 98 | 76 | 94 | | |
| 71 | 100 | 30 | 98 | 78 | 94 | | |

*Substitution Test—Accuracy in Per Cent. Page IV*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 2 | 100 | 10 | 98 | 12 | 76 | 65 | 50 |
| 3 | 100 | 16 | 98 | 20 | 76 | 114 | 46 |
| 5 | 100 | 87 | 98 | 26 | 76 | 44 | 42 |
| 7 | 100 | 108 | 98 | 33 | 76 | 42 | 38 |
| 21 | 100 | 124 | 98 | 39 | 76 | 13 | 36 |
| 23 | 100 | | | 78 | 76 | | |
| 28 | 100 | 71 | 94 | 22 | 72 | 69 | 34 |
| 30 | 100 | 72 | 94 | 29 | 72 | 66 | 30 |
| 31 | 100 | 94 | 94 | 111 | 72 | 127 | 26 |
| 32 | 100 | 51 | 90 | 70 | 68 | 38 | 22 |
| | | 55 | 90 | | | 36 | 18 |
| 34 | 100 | 82 | 90 | 76 | 68 | 73 | 14 |
| 45 | 100 | 103 | 90 | 8 | 66 | 116 | Failure |
| 53 | 100 | 9 | 88 | 14 | 64 | 128 | Failure |
| 56 | 100 | 90 | 88 | 24 | 64 | | |
| 63 | 100 | 40 | 86 | 25 | 64 | | |
| 83 | 100 | | | 84 | 64 | | |
| 85 | 100 | 67 | 86 | 101 | 64 | | |
| 89 | 100 | 100 | 86 | 122 | 64 | | |
| 95 | 100 | 97 | 84 | 52 | 62 | | |
| 106 | 100 | 102 | 84 | 93 | 60 | | |
| | | 104 | 84 | | | | |
| 109 | 100 | 115 | 84 | 92 | 54 | | |
| 117 | 100 | 57 | 82 | 18 | 52 | | |
| 123 | 100 | 81 | 82 | 64 | 52 | | |
| 125 | 100 | 74 | 80 | 91 | 52 | | |
| 129 | 100 | 112 | 80 | 35 | 50 | | |

*Substitution Test—Index, Page I*

| ubject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 34 | 104.0 | 5 | 141.2 | 84 | 191.0 | 103 | 314.6 |
| 125 | 106.2 | 31 | 141.4 | 111 | 192.4 | 39 | 314.8 |
| 71 | 107.4 | 21 | 144.6 | 73 | 197.0 | 64 | 320.4 |
| 23 | 109.1 | 82 | 145.2 | 40 | 198.2 | 81 | 324.4 |
| 10 | 110.9 | 89 | 145.7 | 36 | 198.7 | 42 | 337.2 |
| 45 | 112.8 | | | 78 | 207.7 | | |
| 95 | 115.6 | 30 | 148.4 | 12 | 208.3 | 65 | 413.5 |
| 9 | 116.0 | 87 | 153.3 | 33 | 209.0 | 70 | 492.7 |
| 106 | 116.4 | 7 | 154.0 | 92 | 214.4 | 127 | 511.2 |
| 66 | 116.8 | 93 | 154.3 | 52 | 214.6 | 108 | 601.7 |
| | | 8 | 155.0 | | | 104 | 807.4 |
| 26 | 117.2 | 76 | 155.2 | 24 | 220.4 | 35 | 958.3 |
| 16 | 118.8 | 101 | 158.1 | 38 | 226.0 | 116 | Failure |
| 109 | 121.4 | 100 | 163.9 | 122 | 226.3 | 128 | Failure |
| 129 | 122.5 | 123 | 166.0 | 22 | 228.4 | | |
| 55 | 124.0 | 29 | 167.0 | 85 | 239.5 | | |
| 32 | 124.2 | | | 57 | 242.7 | | |
| 28 | 127.4 | 63 | 168.9 | 53 | 247.2 | | |
| 90 | 131.4 | 51 | 170.0 | 14 | 253.2 | | |
| 72 | 132.8 | 2 | 171.9 | 56 | 256.7 | | |
| 69 | 133.1 | 112 | 172.0 | 74 | 265.9 | | |
| | | 83 | 174.0 | | | | |
| 94 | 135.0 | 102 | 174.3 | 114 | 266.1 | | |
| 97 | 136.0 | 25 | 177.6 | 20 | 270.5 | | |
| 13 | 137.6 | 124 | 179.7 | 18 | 293.3 | | |
| 67 | 138.3 | 3 | 184.5 | 91 | 304.3 | | |
| 117 | 139.4 | 115 | 187.6 | 44 | 310.3 | | |

*Substitution Test—Index, Page II*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 34 | 64.4 | 109 | 112.0 | 93 | 144.5 | 18 | 220.2 |
| 72 | 73.6 | 90 | 112.2 | 115 | 146.4 | 73 | 224.0 |
| 45 | 76.9 | 83 | 113.3 | 111 | 146.9 | 122 | 229.8 |
| 95 | 78.2 | 69 | 113.5 | 85 | 152.2 | 38 | 232.3 |
| 89 | 80.8 | 5 | 114.6 | 20 | 153.0 | 52 | 238.5 |
| 129 | 81.0 | | | 14 | 154.2 | | |
| 10 | 82.4 | 7 | 117.0 | 12 | 154.4 | 127 | 247.1 |
| 23 | 85 0 | 57 | 117.0 | 51 | 154.6 | 91 | 253.1 |
| 82 | 88.2 | 66 | 118.0 | 33 | 155.6 | 65 | 265.9 |
| 123 | 89.2 | 94 | 118.6 | 84 | 158.2 | 108 | 336.0 |
| | | 97 | 118.8 | | | 104 | 364.4 |
| 32 | 89.4 | 40 | 119.0 | 22 | 161.0 | 35 | 812.0 |
| 71 | 90.8 | 117 | 119.0 | 44 | 168.1 | 116 | Failure |
| 16 | 91.2 | 87 | 122 0 | 42 | 173.4 | 128 | Failure |
| 67 | 93.8 | 101 | 122.2 | 78 | 180.3 | | |
| 9 | 94.2 | 102 | 123.3 | 92 | 181.8 | | |
| 125 | 95.5 | | | 53 | 182.3 | | |
| 106 | 98.1 | 30 | 123.4 | 114 | 184.3 | | |
| 29 | 98.9 | 112 | 124.6 | 36 | 188.7 | | |
| 28 | 103.8 | 13 | 125 0 | 24 | 189.6 | | |
| 26 | 104.1 | 25 | 130.2 | 39 | 191.0 | | |
| | | 63 | 130.2 | | | | |
| 55 | 106.0 | 8 | 130.6 | 103 | 198.4 | | |
| 2 | 107.4 | 100 | 131.0 | 74 | 200.0 | | |
| 21 | 107.6 | 76 | 131.9 | 81 | 208.9 | | |
| 3 | 108.3 | 124 | 140.8 | 70 | 215.4 | | |
| 31 | 111.4 | 56 | 143.3 | 64 | 217.3 | | |

*Substitution Test—Index, Page III*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 72 | 65.2 | 67 | 96.5 | 66 | 131.4 | 52 | 194.8 |
| 129 | 69.2 | 90 | 97.8 | 115 | 132.0 | 38 | 204.7 |
| 95 | 70.4 | 83 | 102.0 | 22 | 136.0 | 42 | 205.0 |
| 45 | 72.0 | 55 | 103.0 | 117 | 136.1 | 91 | 215.0 |
| 32 | 74.4 | 28 | 104 0 | 57 | 138.0 | 73 | 222.0 |
| 34 | 75.0 | | | 8 | 138.8 | | |
| 123 | 75.6 | 94 | 104.2 | 51 | 139.0 | 108 | 242.2 |
| 125 | 75.7 | 40 | 105.1 | 25 | 149.8 | 65 | 255.0 |
| 89 | 76.6 | 56 | 105.3 | 92 | 152.2 | 127 | 257.2 |
| 10 | 78.0 | 78 | 105.5 | 76 | 154.0 | 64 | 283.6 |
| | | 109 | 106.6 | | | 104 | 283.8 |
| 82 | 79.0 | 30 | 113.7 | 12 | 154.2 | 35 | 756.8 |
| 31 | 80.2 | 2 | 116.1 | 39 | 155.0 | 116 | Failure |
| 106 | 82.0 | 112 | 116.1 | 44 | 155.7 | 128 | Failure |
| 21 | 87.9 | 85 | 117.2 | 36 | 158.3 | | |
| 29 | 88.2 | 101 | 117.8 | 74 | 159.4 | | |
| 124 | 89.2 | | | 18 | 160.0 | | |
| 102 | 90.7 | 69 | 119.0 | 84 | 161.2 | | |
| 7 | 91.0 | 100 | 120 0 | 114 | 168.0 | | |
| 9 | 91.2 | 93 | 121.2 | 70 | 168.5 | | |
| 16 | 91.2 | 63 | 121.8 | 24 | 176.2 | | |
| | | 20 | 121.9 | | | | |
| 23 | 91.2 | 13 | 125.0 | 33 | 186.3 | | |
| 87 | 92.4 | 111 | 125.2 | 53 | 187.8 | | |
| 3 | 94.2 | 14 | 128.0 | 81 | 188.5 | | |
| 26 | 95 0 | 97 | 128.3 | 103 | 190.6 | | |
| 71 | 95.0 | 5 | 130.6 | 122 | 193.1 | | |

*Substitution Test—Index, Page IV*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 124 | 57.8 | 83 | 97.6 | 70 | 198.6 | 84 | 684.6 |
| 129 | 58.0 | 72 | 97.9 | 26 | 201.6 | 12 | 728.4 |
| 106 | 63.0 | 3 | 99.8 | 29 | 204.4 | 35 | 748.4 |
| 34 | 63.4 | 71 | 99.8 | 112 | 216.0 | 91 | 756.5 |
| 31 | 65.0 | 117 | 100.0 | 111 | 219.5 | 13 | 793.9 |
| 10 | 68.4 | | | 93 | 221.0 | | |
| 123 | 69.0 | 67 | 110.5 | 52 | 242.9 | 38 | 825.5 |
| 45 | 69.6 | 90 | 110.5 | 22 | 270.0 | 66 | 828.7 |
| 23 | 72.0 | 30 | 111.4 | 76 | 275.6 | 73 | 857.1 |
| 95 | 72.8 | 2 | 112.0 | 39 | 278.9 | 42 | 867.4 |
| | | 78 | 113.4 | | | 36 | 972.2 |
| 125 | 73.6 | 100 | 114.0 | 8 | 280.3 | 127 | 1130.8 |
| 89 | 75.0 | 40 | 115.9 | 101 | 283.1 | 116 | Failure |
| 5 | 79.8 | 63 | 116.6 | 44 | 283.8 | 128 | Failure |
| 102 | 80.5 | 65 | 123.2 | 92 | 303.0 | | |
| 7 | 85.6 | 97 | 123.8 | 115 | 313.1 | | |
| 21 | 85.6 | | | 108 | 331.6 | | |
| 87 | 87.1 | 94 | 135.1 | 24 | 338.4 | | |
| 16 | 89.0 | 55 | 138.2 | 14 | 343.8 | | |
| 109 | 90.4 | 57 | 140.2 | 122 | 376.3 | | |
| 85 | 91.6 | 20 | 154.7 | 69 | 391.2 | | |
| | | 81 | 160.2 | | | | |
| 32 | 95.4 | 51 | 165.6 | 18 | 423.1 | | |
| 9 | 96.6 | 104 | 172.2 | 64 | 453.8 | | |
| 28 | 96.6 | 33 | 177.6 | 74 | 486.3 | | |
| 82 | 96.7 | 53 | 183.6 | 25 | 501.6 | | |
| 56 | 97.6 | 103 | 190.0 | 114 | 597.4 | | |

*Number of Sentences Correct*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 3 | 13 | 78 | 13 | 97 | 12 | 65 | 7 |
| 5 | 13 | 83 | 13 | 109 | 12 | 74 | 7 |
| 7 | 13 | 84 | 13 | 122 | 12 | 20 | 6 |
| 9 | 13 | 89 | 13 | 8 | 11 | 35 | 6 |
| 10 | 13 | 90 | 13 | 12 | 11 | 91 | 6 |
| 16 | 13 | | | 21 | 11 | | |
| 23 | 13 | 92 | 13 | 25 | 11 | 38 | 2 |
| 26 | 13 | 93 | 13 | 85 | 11 | 18 | 1 |
| 31 | 13 | 94 | 13 | 101 | 11 | 40 | Failure |
| 32 | 13 | 95 | 13 | 112 | 11 | 44 | Failure |
| | | 100 | 13 | | | 104 | Failure |
| 34 | 13 | 103 | 13 | 114 | 11 | 108 | Failure |
| 36 | 13 | 106 | 13 | 22 | 10 | 116 | Failure |
| 39 | 13 | 117 | 13 | 33 | 10 | 128 | Failure |
| 45 | 13 | 123 | 13 | 70 | 10 | | |
| 51 | 13 | 124 | 13 | 102 | 10 | | |
| 52 | 13 | | | 115 | 10 | | |
| 55 | 13 | 125 | 13 | 127 | 10 | | |
| 56 | 13 | 129 | 13 | 42 | 9 | | |
| 57 | 13 | 2 | 12 | 81 | 9 | | |
| 63 | 13 | 14 | 12 | 111 | 9 | | |
| | | 28 | 12 | | | | |
| 66 | 13 | 30 | 12 | 13 | 8 | | |
| 67 | 13 | 53 | 12 | 64 | 8 | | |
| 69 | 13 | 72 | 12 | 73 | 8 | | |
| 71 | 13 | 82 | 12 | 24 | 7 | | |
| 76 | 13 | 87 | 12 | 29 | 7 | | |

*Sentences—Number of Ideas*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 31 | 48 | 7 | 29 | 78 | 23 | 38 | 13 |
| 89 | 43 | 30 | 29 | 52 | 22 | 73 | 13 |
| 26 | 41 | 45 | 29 | 76 | 22 | 65 | 12 |
| 84 | 41 | 112 | 29 | 85 | 22 | 74 | 11 |
| 5 | 40 | 82 | 28 | 129 | 22 | 35 | 10 |
| 32 | 40 | | | 21 | 21 | | |
| 63 | 40 | 117 | 28 | 28 | 21 | 18 | 7 |
| 69 | 40 | 124 | 28 | 66 | 21 | 64 | 7 |
| 125 | 39 | 71 | 27 | 8 | 20 | 40 | Failure |
| 9 | 37 | 95 | 27 | 12 | 20 | 44 | Failure |
| | | 114 | 27 | | | 104 | Failure |
| 92 | 37 | 122 | 27 | 33 | 20 | 108 | Failure |
| 34 | 36 | 2 | 26 | 39 | 20 | 116 | Failure |
| 16 | 34 | 94 | 26 | 111 | 20 | 128 | Failure |
| 57 | 34 | 123 | 26 | 22 | 19 | | |
| 3 | 33 | 103 | 25 | 101 | 19 | | |
| 93 | 33 | | | 29 | 18 | | |
| 83 | 32 | 14 | 24 | 102 | 18 | | |
| 90 | 32 | 23 | 24 | 127 | 18 | | |
| 10 | 31 | 36 | 24 | 13 | 16 | | |
| 53 | 31 | 51 | 24 | 20 | 16 | | |
| | | 56 | 24 | | | | |
| 67 | 31 | 97 | 24 | 24 | 16 | | |
| 87 | 31 | 100 | 24 | 115 | 16 | | |
| 106 | 31 | 109 | 24 | 81 | 15 | | |
| 25 | 30 | 55 | 23 | 42 | 14 | | |
| 70 | 30 | 72 | 23 | 91 | 14 | | |

*Sentences—Index of Ideas*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 26 | 3.4 | 100 | 6.5 | 111 | 10.7 | 74 | 27.4 |
| 57 | 3.8 | 117 | 6.5 | 32 | 10.8 | 35 | 28.5 |
| 31 | 4.2 | 85 | 6.9 | 114 | 11.0 | 12 | 30.2 |
| 125 | 4.5 | 94 | 6.9 | 83 | 11.2 | 65 | 35.5 |
| 84 | 4.6 | 123 | 7.0 | 10 | 11.9 | 73 | 39.4 |
| 71 | 4.8 | | | 76 | 14.2 | | |
| 7 | 5.2 | 69 | 7.5 | 25 | 15.0 | 18 | 40.4 |
| 90 | 5.2 | 3 | 7.8 | 28 | 15.6 | 64 | 40.4 |
| 129 | 5.2 | 53 | 7.8 | 39 | 16.0 | 40 | Failure |
| 109 | 5.4 | 63 | 7.8 | 14 | 16.7 | 44 | Failure |
| | | 97 | 7.8 | | | 104 | Failure |
| 45 | 5.5 | 23 | 8.0 | 56 | 16.8 | 108 | Failure |
| 52 | 5.5 | 103 | 8.1 | 2 | 18.0 | 116 | Failure |
| 106 | 5.6 | 87 | 8.2 | 8 | 18.9 | 128 | Failure |
| 51 | 5.7 | 122 | 8.2 | 38 | 20.2 | | |
| 67 | 5.7 | 124 | 8.2 | 29 | 20.9 | | |
| 92 | 5.8 | | | 21 | 21.7 | | |
| 9 | 5.9 | 101 | 8.3 | 22 | 22.2 | | |
| 66 | 6.0 | 78 | 9.1 | 24 | 22.9 | | |
| 89 | 6.0 | 34 | 9.3 | 20 | 23.8 | | |
| 95 | 6.0 | 70 | 9.4 | 102 | 23.8 | | |
| | | 16 | 9.6 | | | | |
| 72 | 6.2 | 55 | 9.6 | 13 | 24.7 | | |
| 93 | 6.3 | 115 | 9.9 | 127 | 25.5 | | |
| 112 | 6.3 | 30 | 10.0 | 81 | 25.8 | | |
| 5 | 6.4 | 33 | 10.1 | 42 | 26.9 | | |
| 82 | 6.5 | 36 | 10.3 | 91 | 26.9 | | |

*Sentences—Number with an Association Time of 2 Seconds or Less*

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 3 | 12 | 123 | 7 | 87 | 2 | 53 | 0 |
| 26 | 12 | 5 | 6 | 93 | 2 | 65 | 0 |
| 45 | 12 | 18 | 6 | 111 | 2 | 73 | 0 |
| 90 | 12 | 36 | 6 | 112 | 2 | 74 | 0 |
| 129 | 12 | 124 | 6 | 25 | 1 | 91 | 0 |
| 52 | 11 | | | 28 | 1 | | |
| 57 | 11 | 70 | 5 | 29 | 1 | 114 | 0 |
| 67 | 11 | 95 | 5 | 34 | 1 | 115 | 0 |
| 109 | 11 | 117 | 5 | 56 | 1 | 40 | Failure |
| 81 | 10 | 24 | 4 | 76 | 1 | 44 | Failure |
| | | 42 | 4 | | | 104 | Failure |
| 102 | 10 | 92 | 4 | 103 | 1 | 108 | Failure |
| 125 | 10 | 94 | 4 | 127 | 1 | 116 | Failure |
| 7 | 9 | 101 | 4 | 2 | 0 | 128 | Failure |
| 31 | 9 | 23 | 3 | 8 | 0 | | |
| 84 | 9 | 33 | 3 | 10 | 0 | | |
| 71 | 8 | | | 12 | 0 | | |
| 72 | 8 | 55 | 3 | 13 | 0 | | |
| 85 | 8 | 78 | 3 | 14 | 0 | | |
| 89 | 8 | 9 | 2 | 16 | 0 | | |
| 100 | 8 | 35 | 2 | 20 | 0 | | |
| | | 38 | 2 | | | | |
| 51 | 7 | 63 | 2 | 21 | 0 | | |
| 66 | 7 | 64 | 2 | 22 | 0 | | |
| 97 | 7 | 69 | 2 | 30 | 0 | | |
| 106 | 7 | 82 | 2 | 32 | 0 | | |
| 122 | 7 | 83 | 2 | 39 | 0 | | |

*Opposites Accuracy, in Per Cent.*

(With each Accuracy Arranged in Order of Time)

| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
|---|---|---|---|---|---|---|---|
| 52 | 100.0 | 66 | 85.0 | 78 | 65.0 | 122 | 12.5 |
| 129 | 97.5 | 111 | 85.0 | 33 | 65.0 | 35 | 12.5 |
| 97 | 97.5 | 87 | 85.0 | 3 | 65.0 | 42 | 10.0 |
| 125 | 97.5 | 31 | 82.5 | 92 | 62.5 | 74 | 5.0 |
| 71 | 95.0 | 112 | 82.5 | 109 | 62.5 | 18 | Failure |
| 67 | 95.0 | | | 64 | 62.5 | | |
| 95 | 95.0 | 55 | 82.5 | 102 | 62.5 | 20 | Failure |
| 32 | 95.0 | 124 | 80.0 | 81 | 60.0 | 24 | Failure |
| 90 | 92.5 | 69 | 80.0 | 91 | 60.0 | 40 | Failure |
| 9 | 92.5 | 106 | 80.0 | 73 | 55.0 | 44 | Failure |
| | | 5 | 75.0 | | | 104 | Failure |
| 85 | 92.5 | 53 | 75.0 | 36 | 55.0 | 108 | Failure |
| 117 | 92.5 | 12 | 75.0 | 8 | 52.5 | 116 | Failure |
| 100 | 92.5 | 45 | 72.5 | 25 | 50.0 | 128 | Failure |
| 34 | 92.5 | 84 | 72.5 | 2 | 50.0 | | |
| 57 | 90.0 | 82 | 72.5 | 22 | 47.5 | | |
| 23 | 90.0 | | | 101 | 45.0 | | |
| 7 | 90.0 | 123 | 72.5 | 114 | 55.0 | | |
| 83 | 90.0 | 115 | 72.5 | 76 | 42.5 | | |
| 51 | 87.5 | 28 | 72.5 | 63 | 42.5 | | |
| 26 | 87.5 | 39 | 72.5 | 13 | 40.0 | | |
| | | 29 | 72.5 | | | | |
| 93 | 87.5 | 103 | 70.0 | 56 | 37.5 | | |
| 16 | 87.5 | 89 | 70.0 | 21 | 30.0 | | |
| 30 | 87.5 | 38 | 67.5 | 70 | 27.5 | | |
| 10 | 87.5 | 127 | 67.5 | 14 | 22.5 | | |
| 94 | 85.0 | 72 | 65.0 | 65 | 22.5 | | |

COLLEGE MAIDS

*Card Sorting—Index*

| Subject | Score | Subject | Score |
|---|---|---|---|
| 20 | 28.0 | 11 | 38.0 |
| 18 | 30.0 | 1 | 38.6 |
| 17 | 34.0 | 12 | 38.8 |
| 10 | 34.0 | 8 | 40.0 |
| 19 | 34.1 | 6 | 41.9 |
| 16 | 35.0 | 4 | 42.0 |
| 13 | 35.6 | 5 | 42.0 |
| 15 | 35.9 | 3 | 44.4 |
| 14 | 36.0 | 2 | 45.5 |

COLLEGE MAIDS

*Cancellation, "a" Test—Accuracy in Per Cent.*

(With Each Accuracy Arranged in Order of time)

| Subject | Score | Subject | Score |
|---|---|---|---|
| 18 | 100 | 1 | 94 |
| 17 | 100 | 11 | 94 |
| 13 | 100 | 6 | 92 |
| 4 | 100 | 20 | 92 |
| 19 | 98 | 8 | 90 |
| 3 | 98 | 12 | 88 |
| 10 | 98 | 2 | 70 |
| 16 | 96 | 14 | 60 |
| 5 | 96 | 16 | 48 |

COLLEGE MAIDS

*Cancellation, "a" Test—Index*

| Subject | Score | Subject | Score |
|---|---|---|---|
| 6 | 127.0 | 1 | 196.6 |
| 18 | 140.0 | 2 | 200.0 |
| 19 | 145.9 | 17 | 203.6 |
| 3 | 153.3 | 10 | 204.1 |
| 16 | 159.4 | 13 | 214.0 |
| 20 | 163.0 | 8 | 232.2 |
| 12 | 163.6 | 15 | 251.7 |
| 5 | 176.0 | 4 | 260.2 |
| 11 | 196.4 | 14 | 280.0 |

COLLEGE MAIDS

*Memory Span—No. of Digits Recalled*

| Subject | Score | Subject | Score |
|---|---|---|---|
| 20 | 9 | 11 | 9 |
| 19 | 9 | 3 | 9 |
| 18 | 9 | 6 | 8 |
| 17 | 9 | 10 | 8 |
| 16 | 9 | 8 | 8 |
| 15 | 9 | 4 | 7 |
| 14 | 9 | 5 | 7 |
| 13 | 9 | 2 | 6 |
| 12 | 9 | 1 | 6 |

COLLEGE MAIDS

*Substitution Test—Accuracy in Per Cent.*

| *Page 1* | | *Page 2* | | *Page 3* | | *Page 4* | |
|---|---|---|---|---|---|---|---|
| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
| 1 | 100 | 1 | 100 | 1 | 100 | 4 | 100 |
| 4 | 100 | 2 | 100 | 5 | 100 | 5 | 100 |
| 6 | 100 | 5 | 100 | 8 | 100 | 8 | 100 |
| 10 | 100 | 12 | 100 | 11 | 100 | 11 | 100 |
| 12 | 100 | 15 | 100 | 12 | 100 | 18 | 98 |
| 13 | 100 | 18 | 100 | 13 | 100 | 19 | 96 |
| 3 | 98 | 19 | 100 | 18 | 100 | 2 | 88 |
| 5 | 98 | 4 | 98 | 19 | 100 | 6 | 88 |
| 8 | 98 | 6 | 98 | 20 | 100 | 1 | 86 |
| 11 | 98 | 10 | 98 | 2 | 98 | 10 | 86 |
| 15 | 98 | 11 | 98 | 10 | 98 | 20 | 86 |
| 17 | 98 | 20 | 98 | 17 | 98 | 13 | 84 |
| 19 | 98 | 13 | 96 | 3 | 96 | 16 | 84 |
| 16 | 96 | 17 | 96 | 4 | 96 | 12 | 72 |
| 18 | 96 | 8 | 94 | 14 | 96 | 15 | 66 |
| 20 | 94 | 14 | 94 | 6 | 94 | 14 | 62 |
| 2 | 92 | 16 | 94 | 15 | 94 | 3 | 60 |
| 14 | 86 | 3 | 92 | 16 | 94 | 17 | 54 |

COLLEGE MAIDS

*Substitution Test—Index*

| *Page 1* | | *Page 2* | | *Page 3* | | *Page 4* | |
|---|---|---|---|---|---|---|---|
| Subject | Score | Subject | Score | Subject | Score | Subject | Score |
| 11 | 113.3 | 11 | 81.6 | 10 | 71.4 | 11 | 62.6 |
| 10 | 118.8 | 10 | 83.1 | 11 | 76.0 | 5 | 66.4 |
| 19 | 120.6 | 19 | 93.0 | 5 | 78.8 | 4 | 73.9 |
| 17 | 123.7 | 5 | 95.4 | 4 | 82.4 | 18 | 87.0 |
| 20 | 137.2 | 4 | 103.1 | 1 | 86.2 | 10 | 89.5 |
| 12 | 138.0 | 20 | 103.5 | 19 | 86.6 | 20 | 99.8 |
| 1 | 150.0 | 12 | 104.0 | 18 | 87.2 | 19 | 118.8 |
| 6 | 151.0 | 2 | 105.8 | 2 | 96.5 | 2 | 122.7 |
| 13 | 153.2 | 1 | 112.0 | 20 | 97.2 | 16 | 136.9 |
| 16 | 160.2 | 18 | 120.6 | 12 | 101.4 | 8 | 137.0 |
| 4 | 161.8 | 16 | 121.7 | 16 | 109.4 | 12 | 142.8 |
| 3 | 172.4 | 17 | 127.1 | 13 | 115.4 | 1 | 161.6 |
| 8 | 176.9 | 6 | 128.0 | 17 | 130.4 | 6 | 181.8 |
| 15 | 190.6 | 15 | 128.0 | 15 | 136.5 | 13 | 193.3 |
| 18 | 200.0 | 13 | 135.2 | 6 | 138.3 | 15 | 200.9 |
| 5 | 209.2 | 3 | 153.0 | 3 | 146.0 | 17 | 225.9 |
| 2 | 285.0 | 8 | 210.4 | 8 | 165.2 | 3 | 455.0 |
| 14 | 428.6 | 14 | 312.8 | 14 | 229.4 | 14 | 544.2 |

COLLEGE MAIDS

*Opposites—Accuracy in Per Cent.*

With Each Accuracy Arranged in Order of Time

| Subject | Score | Subject | Score |
|---|---|---|---|
| 20 | 100.0 | 12 | 85.0 |
| 18 | 100.0 | 1 | 85.0 |
| 10 | 97.5 | 8 | 82.5 |
| 19 | 95.0 | 11 | 80.0 |
| 17 | 90.0 | 4 | 62.5 |
| 16 | 90.0 | 6 | 60.0 |
| 15 | 87.5 | 5 | 52.5 |
| 14 | 87.5 | 2 | 25.0 |
| 13 | 87.5 | 3 | 10.0 |

## Original Scores of Tests not in the Bureau of Vocational Guidance Series

*Original Scores. Writing Standard Phrase. Time in Secs. and Ratings by Ayres' and by Thorndike's Scale for Measuring Handwriting. Bedford 88.*

| Subject | Secs. | Ayres' scale | Thorndike's scale | Subject | Secs. | Ayres' scale | Thorndike's scale |
|---|---|---|---|---|---|---|---|
| 84 | 7.0 | 40 | 11 | 56* | 15.8 | 40 | 9 |
| 67 | 7.6 | 40 | 10 | 102* | 15.8 | 30 | 9 |
| 7 | 8.0 | 50 | 12 | 122* | 15.8 | 30 | 9 |
| 94 | 8.0 | 40 | 11 | 2 | 16.0 | 50 | 12 |
| 106 | 8.6 | 70 | 13 | 12 | 16.0 | 40 | 12 |
| 89 | 8.8 | 50 | 12 | 22* | 16.0 | 40 | 9 |
| 90 | 9.0 | 50 | 15 | 34 | 16.0 | 50 | 11 |
| 109 | 9.0 | 40 | 11 | 45 | 16.0 | 60 | 14 |
| 31 | 9.2 | 60 | 13 | 51* | 16.6 | 40 | 11 |
| 66 | 9.4 | 50 | 12 | 73 | 16.6 | 70 | 14 |
| 71 | 9.4 | 50 | 12 | 92* | 17.0 | 60 | 13 |
| 103 | 9.6 | 60 | 12 | 16 | 17.2 | 60 | 15 |
| 32 | 10.0 | 50 | 13 | 74 | 17.4 | 50 | 11 |
| 76 | 10.0 | 50 | 12 | 63 | 18.0 | 40 | 11 |
| 111 | 10.0 | 40 | 9 | 127* | 19.0 | 30 | 8 |
| 5 | 10.2 | 60 | 14 | 28 | 19.0 | 40 | 12 |
| 26 | 10.2 | 40 | 14 | 3 | 19.6 | 80 | 15 |
| 30 | 10.2 | 60 | 16 | 81* | 19.6 | 20 | 6 |
| 78 | 10.2 | 50 | 13 | 55 | 21.0 | 50 | 9 |
| 23 | 10.6 | 60 | 15 | 70 | 21.0 | 40 | 9 |
| 29* | 11.0 | 50 | 12 | 39 | 23.0 | 30 | 9 |
| 57 | 11.0 | 60 | 11 | 65* | 23.0 | 20 | 8 |
| 93 | 11.0 | 70 | 13 | 24* | 25.4 | 30 | 8 |
| 123* | 11.2 | 50 | 12 | 44* | 27.6 | 40 | 8 |
| 82 | 11.6 | 40 | 11 | 114* | 32.8 | 20 | 6 |
| 101* | 11.8 | 40 | 11 | 53* | 37.6 | 20 | 7 |
| 38* | 12.0 | 30 | 9 | 20* | 42.6 | 20 | 9 |
| 83 | 12.0 | 50 | 12 | 8* | 52.0 | 40 | 9 |
| 115* | 12.0 | 40 | 12 | 42* | 70.4 | 20 | 7 |
| 125 | 12.0 | 50 | 11 | 91* | 72.4 | 20 | 7 |
| 72 | 12.2 | 50 | 13 | 18* | Failures | 20— | 0 |
| 97 | 12.2 | 60 | 13 | 35* | Failures | 20— | 0 |
| 69 | 12.4 | 40 | 9 | 40* | Failures | 20— | 0 |
| 112* | 12.6 | 60 | 12 | 64* | Failures | 20— | 0 |
| 129 | 12.6 | 50 | 15 | 104* | Failures | 20— | 0 |
| 14 | 12.8 | 50 | 12 | 108* | Failures | 20— | 0 |
| 100 | 13.0 | 60 | 14 | 116* | Failures | 20— | 0 |
| 52 | 13.2 | 60 | 12 | 128* | Failures | 20— | 0 |
| 36 | 13.4 | 60 | 13 | | | | |
| 25 | 13.8 | 60 | 15 | | | | |
| 33 | 14.0 | 50 | 9 | | | | |
| 87* | 14.0 | 50 | 9 | | | | |
| 124* | 14.0 | 50 | 11 | | | | |
| 13 | 14.8 | 50 | 12 | | | | |
| 21 | 14.8 | 40 | 11 | | | | |
| 95 | 14.8 | 60 | 15 | | | | |
| 9 | 15.0 | 60 | 13 | | | | |
| 85* | 15.2 | 50 | 14 | | | | |
| 10 | 15.6 | 40 | 9 | | | | |
| 117 | 15.6 | 60 | 13 | | | | |

*Below Grade Group.

*Original Scores. Reading of Standard Passage—Time in Secs. Bedford 88.*

| Subject | Seconds |
|---|---|
| 26 | 9.4 |
| 125 | 9.8 |
| 23 | 10.0 |
| 28 | 10.0 |
| 95 | 10.6 |
| 67 | 10.8 |
| 76 | 11.0 |
| 78 | 11.2 |
| 115 | 11.2 |
| 73 | 11.4 |
| 82 | 11.4 |
| 117 | 11.4 |
| 25 | 11.6 |
| 31 | 11.6 |
| 51 | 11.6 |
| 16 | 11.8 |
| 94 | 11.9 |
| 34 | 12.0 |
| 84 | 12.0 |
| 66 | 12.2 |
| 89 | 12.4 |
| 52 | 12.6 |
| 106 | 12.6 |
| 72 | 12.8 |
| 90 | 13.0 |
| 97 | 13.0 |
| 32 | 13.2 |
| 129 | 13.2 |
| 93 | 13.6 |
| 71 | 13.8 |
| 122 | 13.8 |
| 12 | 14.0 |
| 45 | 14.0 |
| 63 | 14.0 |
| 69 | 14.0 |
| 100 | 14.0 |
| 30 | 14.2 |
| 3 | 15.0 |
| 5 | 15.0 |
| 13 | 15.0 |
| 57 | 15.0 |
| 111 | 15.0 |
| 7 | 15.6 |
| 9 | 15.8 |
| 38 | 15.8 |
| 85 | 15.8 |
| 10 | 16.0 |
| 22 | 16.0 |
| 55 | 16.0 |
| 83 | 16.4 |
| 123 | 16.4 |
| 103 | 16.6 |
| 92 | 16.8 |
| 124 | 16.8 |
| 39 | 17.0 |
| 109 | 18.0 |
| 36 | 18.2 |
| 8 | 19.0 |
| 101 | 19.0 |
| 87 | 20.0 |
| 112 | 22.0 |
| 21 | 22.2 |
| 56 | 23.0 |
| 33 | 24.0 |
| 14 | 26.0 |
| 2 | 28.0 |
| 70 | 29.0 |
| 81 | 33.0 |
| 29 | 40.0 |
| 127 | 41.0 |
| 44 | 50.0 |
| 65 | 52.4 |
| 24 | 53.0 |
| 53 | 67.0 |
| 74 | 71.0 |
| 114 | 83.0 |
| 102 | 95.0 |
| 20 | A few words in English. |
| 91 | A few words in English. |
| 104 | A little in own language. |
| 108 | A little in own language. |
| 18 | In no language. |
| 35 | In no language. |
| 40 | In no language. |
| 42 | In no language. |
| 64 | In no language. |
| 116 | In no language. |
| 128 | In no language. |

*Original Scores. Easy Direction Test of Woodworth and Wells. Per Cent. of Accuracy and Time in Secs. Bedford 88—60.*

| Subject | Acc. | Seconds | Subject | Acc. | Seconds |
|---|---|---|---|---|---|
| 126 | 100.0 | 87.0 | 67 | 90.0 | 97.2 |
| 45 | 100.0 | 87.0 | 32 | 90.0 | 102.0 |
| 94 | 100.0 | 89.8 | 9 | 90.0 | 108.0 |
| 100 | 100.0 | 99.0 | 12 | 90.0 | 164.8 |
| 99 | 100.0 | 104.0 | 13 | 87.5 | 144.8 |
| 30 | 100.0 | 134.6 | 8 | 87.5 | 204.6 |
| 69 | 100.0 | 136.8 | 38 | 87.5 | 220.0 |
| 10 | 100.0 | 142.6 | 76 | 85.0 | 136.2 |
| 51 | 100.0 | 145.0 | 56 | 80.0 | 330.0 |
| 66 | 97.5 | 77.8 | 22 | 80.0 | 340.6 |
| 87 | 97.5 | 146.0 | 21 | 77.5 | 191.0 |
| 23 | 95.0 | 70.0 | 29 | 77.5 | 250.0 |
| 84 | 95.0 | 86.6 | 72 | 75.0 | 137.0 |
| 7 | 95.0 | 96.6 | 2 | 72.5 | 201.6 |
| 34 | 95.0 | 109.8 | 36 | 70.0 | 147.0 |
| 55 | 95.0 | 114.8 | 65 | 67.5 | 371.8 |
| 25 | 95.0 | 118.4 | 74 | 67.5 | 397.4 |
| 89 | 95.0 | 128.0 | 92 | 60.0 | 122.2 |
| 85 | 95.0 | 130.2 | 33 | 52.5 | 199.0 |
| 73 | 95.0 | 146.6 | 39 | 52.5 | 279.0 |
| 5 | 95.0 | 151.6 | 24 | 47.5 | 235.8 |
| 63 | 95.0 | 164.8 | 14 | 47.5 | 252.6 |
| 28 | 95.0 | 173.6 | 70 | 35.0 | 241.6 |
| 90 | 92.5 | 72.0 | 18 | Failure | |
| 52 | 92.5 | 76.0 | 20 | Failure | |
| 83 | 92.5 | 92.0 | 35 | Failure | |
| 31 | 92.5 | 98.0 | 40 | Failure | |
| 78 | 90.0 | 87.0 | 42 | Failure | |
| 57 | 90.0 | 91.8 | 44 | Failure | |
| 71 | 90.0 | 92.6 | 91 | Failure | |

*Original Scores. Hard Direction Test of Woodworth and Wells. Per Cent. of Accuracy and Time in Secs. Lab. Group—80*

| Subj. | Acc. | Secs. | Subj. | Acc. | Secs. |
|---|---|---|---|---|---|
| 171 | 97.5 | 160.6 | 165 | 77.5 | 270.0 |
| 197 | 97.5 | 228.0 | 929 | 72.5 | 523.0 |
| 198 | 97.5 | 134.6 | 860 | 70.0 | 123.0 |
| 180 | 95.0 | 158.0 | 183 | 70.0 | 188.4 |
| 923 | 95.0 | 193.6 | 170 | 70.0 | 202.8 |
| 161 | 92.5 | 169.2 | 184 | 67.5 | 314.2 |
| 192 | 92.5 | 226.0 | 933 | 65.0 | 235.0 |
| 906 | 92.5 | 256.0 | 928 | 65.0 | 369.8 |
| 175 | 90.0 | 210.0 | 951 | 65.0 | 570.0 |
| 935 | 90.0 | 520.0 | 169 | 65.0 | 204.0 |
| 947 | 90.0 | 297.0 | 172 | 62.5 | 269.0 |
| 901 | 87.5 | 319.0 | 909 | 60.0 | 290.0 |
| 911 | 87.5 | 216.0 | 937 | 57.5 | 251.6 |
| 946 | 87.5 | 140.2 | 186 | 55.0 | 252.0 |
| 181 | 85.0 | 218.0 | 168 | 52.5 | 300.0 |
| 917 | 85.0 | 326.0 | 939 | 52.5 | 223.2 |
| 957 | 85.0 | 227.0 | 903 | 52.5 | 413.0 |
| 941 | 82.5 | 156.0 | 189 | 50.0 | 328.0 |
| 955 | 82.5 | 139.0 | 193 | 47.5 | 381.6 |
| 164 | 80.0 | 144.0 | 908 | 42.5 | 285.8 |
| 958 | 80.0 | 153.8 | 959 | 40.0 | 425.0 |
| 173 | 80.0 | 163.0 | 163 | 37.5 | 227.4 |
| 199 | 80.0 | 165.0 | 194 | 37.5 | 432.0 |
| 916 | 80.0 | 228.0 | 177 | 25.0 | 485.0 |
| 922 | 80.0 | 233.0 | 167 | Failure | |
| 926 | 80.0 | 246.0 | 178 | Failure | |
| 927 | 80.0 | 328.8 | 904 | Failure | |
| 919 | 80.0 | 511.6 | 918 | Failure | |
| 910 | 77.5 | 212.0 | 925 | Failure | |
| 930 | 77.5 | 252.0 | 956 | Failure | |

*Original Scores. Easy Direction Test of Woodworth and Wells. Per Cent. of Accuracy and Time in Secs. College Maids*

| Subj. | Acc. | Secs. | Subj. | Acc. | Secs. |
|---|---|---|---|---|---|
| 17 | 100.0 | 57.2 | 11 | 90.0 | 131.0 |
| 20 | 100.0 | 63.8 | 7 | 90.0 | 132.0 |
| 18 | 100.0 | 69.4 | 1 | 90.0 | 203.0 |
| 10 | 100.0 | 72.2 | 6 | 85.0 | 110.6 |
| 19 | 97.5 | 76.4 | 2 | 80.0 | 150.6 |
| 8 | 97.5 | 108.2 | 5 | 77.5 | 283.8 |
| 9 | 95.0 | 92.0 | 15 | 75.0 | 105.0 |
| 12 | 95.0 | 115.4 | 3 | 75.0 | 248.0 |
| 13 | 90.0 | 109.8 | 14 | 65.0 | 169.0 |
| 16 | 90.0 | 118.0 | 4 | 65.0 | 226.0 |

*Original Scores. Hard Direction Test of Woodworth and Wells. Per Cent. of Accuracy and Time in Secs. College Maids*

| Subj. | Acc. | Secs. | Subj. | Acc. | Secs. |
|---|---|---|---|---|---|
| 13 | 97.5 | 232.2 | 11 | 87.5 | 184.8 |
| 19 | 92.5 | 133.4 | 20 | 82.5 | 125.8 |
| 17 | 90.0 | 79.4 | 18 | 75.0 | 79.0 |
| 10 | 90.0 | 155.0 | 7 | 75.0 | 160.0 |
| 15 | 90.0 | 192.0 | 5 | 67.5 | 186.0 |
| 16 | 90.0 | 200.0 | 4 | 65.0 | 284.4 |
| 1 | 90.0 | 251.0 | 14 | 62.5 | 283.0 |
| 12 | 90.0 | 255.0 | 2 | 55.0 | 170.0 |
| 9 | 90.0 | 256.0 | 6 | 47.5 | 257.4 |
| 8 | 90.0 | 280.0 | 3 | 45.0 | 345.0 |

*Original Scores. Cross Line Test A. Number of Trials and Time in Secs. Bedford 88–43*

| Subj. | No. of Trials | Time | Subj. | No. of Trials | Time | |
|---|---|---|---|---|---|---|
| 45 | 1+ | 8.4 | 5 | 2+ | 53.6 | |
| 23 | | 8.6 | 52 | | 67.0 | |
| 55 | | 9.2 | 39 | | 70.0 | |
| 30 | | 10.0 | 3 | | 72.6 | |
| 31 | | 10.0 | 25 | | 83.0 | |
| 16 | | 11.0 | 18 | | 91.4* | |
| 10 | | 12.8 | 38 | | 240.0* | |
| 7 | | 13.0 | 36 | 3+ | 240.0 | |
| 26 | | 14.2 | | | | |
| 40 | | 15.0* | 57 | | 458.0 | |
| | | | 22 | 3— | 102.0* | (3 errors) |
| 2 | | 15.2 | 14 | | 105.0 | (2 " ) |
| 34 | | 15.2 | 53 | | 105.0 | (4 " ) |
| 32 | | 15.8 | 44 | | 122.0* | (3 " ) |
| 12 | | 16.0 | 20 | | 130.0* | (4 " ) |
| 51 | | 16.0* | 28 | | 131.6 | (2 " ) |
| 63 | | 16.0 | 64 | | 155.0* | (2 " ) |
| 21 | | 18.0 | 35 | | 160.0* | (3 " ) |
| 53 | | 18.0* | 24 | | 170.0* | (2 " ) |
| 8 | | 18.2* | | | | |
| 56 | | 20.0* | 65 | | 185.0* | (3 " ) |
| | | | 9 | | 190.0 | (3 " ) |
| 13 | | 25.0 | 42 | | 320.0* | (3 " ) |
| 29 | | 26.8* | | | | |

In the column giving the scores, *one plus* means that the test was solved on the first trial and *two plus* on the second trial after one reproduction of the figure; *three plus* on the third trial after a second reproduction of the figure. *Three minus* indicates that the third trial contained errors from one to four which the subject was unable to correct. Those starred are the Below Grade Group. The others had finished at least the fifth B grade.

*Original Scores. Cross Line Test B. Number of Trials and Time in Seconds. Bedford 88–43*

| Subj. | No. of Trials | Time | Subj. | No. of Trials | Time | |
|---|---|---|---|---|---|---|
| 45 | 1+ | 42.0 | 24 | 3— | 240.0* | (8 errors) |
| 16 | | 49.4 | 42 | | 258.0* | (9 " ) |
| 10 | | 50.0 | 33 | | 304.0 | (8 " ) |
| 13 | | 52.0 | 14 | | 304.8 | (6 " ) |
| 31 | | 60.0 | 44 | | 305.0* | (9 " ) |
| 7 | | 60.8 | 38 | | 340.0* | (8 " ) |
| 21 | | 71.8 | 52 | | 345.0 | (8 " ) |
| 12 | | 87.0 | 56 | | 350.0* | (9 " ) |
| 34 | | 89.0 | | | | |
| 25 | | 90.0 | 64 | | 365.0* | (8 " ) |
| | | | 22 | | 375.4* | (8 " ) |
| 23 | | 90.8 | 9 | | 455.6 | (8 " ) |
| 55 | | 104.2 | 63 | | 480.0 | (2 " ) |
| 30 | | 140.0 | 40 | | 480.0* | (5 " ) |
| 32 | | 140.2 | 18 | | 521.2* | (2 " ) |
| 57 | 2+ | 66.0 | 65 | | 540.0* | (5 " ) |
| 26 | | 199.0 | 51 | | 545.0* | (2 " ) |
| 5 | | 292.0 | 3 | | 618.0 | (8 " ) |
| 53 | | 317.2* | 8 | | 640.0* | (3 " ) |
| 28 | | 373.0 | | | | |
| 29 | 3+ | 302.4* | 39 | | 658.8 | (8 " ) |
| | | | 20 | Failure | 105.0* | |
| 36 | | 455.0 | 35 | Failure | 120.0* | |
| 2 | | 632.4 | | | | |

In the column headed "No. of Trials," *one plus* means that the test was solved on the first trial and *two plus* on the second trial after one reproduction of the figure; *three plus* on the third trial after a second reproduction of the figure. *Three minus* indicates that the third trial contained from one to nine errors which the subject was unable to correct. Those starred are the Below Grade Group.

*Original Scores. Construction Test A. Time in Seconds, Number of Additional Moves, of Impossible Moves and Repetition of Impossible Moves. Bedford 88*

| Subj. | Time | Add. Moves | Imp. Moves | Rep. of Imp. Moves | Subj. | Time | Add. Moves | Imp. Moves | Rep. of Imp. Moves | |
|---|---|---|---|---|---|---|---|---|---|---|
| 72 | 5.2 | 0 | 0 | 0 | 26 | 60.0 | 6 | 9 | 3 | |
| 102 | 7.4 | 1 | 0 | 0 | 65 | 60.0 | 6 | 0 | 0 | |
| 95 | 7.8 | 0 | 0 | 0 | 51 | 61.8 | 10 | 5 | 3 | |
| 45 | 8.6 | 0 | 0 | 0 | 94 | 62.8 | 18 | 0 | 0 | |
| 82 | 9.4 | 0 | 0 | 0 | 55 | 65.6 | 3 | 3 | 4 | |
| 5 | 9.8 | 0 | 0 | 0 | 39 | 74.0 | 5 | 6 | 3 | |
| 87 | 10.0 | 0 | 0 | 0 | 100 | 80.0 | 18 | 1 | 0 | |
| 111 | 10.0 | 1 | 0 | 0 | 2 | 82.0 | 9 | 7 | 2 | |
| 18 | 11.0 | 0 | 0 | 0 | 14 | 84.0 | 7 | 8 | 2 | |
| 66 | 11.4 | 1 | 0 | 0 | 85 | 88.0 | 17 | 5 | 0 | |
| 71 | 11.6 | 0 | 0 | 0 | 108 | 90.0 | 8 | 2 | 1 | |
| 109 | 11.6 | 0 | 0 | 0 | 64 | 91.8 | 10 | 8 | 3 | |
| 117 | 12.2 | 1 | 0 | 0 | 127 | 95.0 | 18 | 4 | 1 | |
| 30 | 13.0 | 3 | 0 | 0 | 33 | 97.0 | 13 | 13 | 7 | |
| 90 | 13.6 | 2 | 0 | 0 | 35 | 108.0 | 15 | 13 | 6 | |
| 69 | 14.0 | 1 | 0 | 0 | 22 | 121.4 | 6 | 14 | 5 | |
| 106 | 14.0 | 1 | 0 | 0 | 74 | 123.4 | 12 | 3 | 5 | |
| 123 | 14.0 | 1 | 0 | 0 | 92 | 133.4 | 26 | 4 | 2 | |
| 31 | 15.2 | 2 | 0 | 0 | 97 | 134.6 | 28 | 8 | 1 | |
| 16 | 17.0 | 4 | 0 | 0 | 52 | 135.0 | 14 | 12 | 6 | |
| 32 | 17.0 | 3 | 1 | 0 | 115 | 149.0 | 18 | 7 | 2 | |
| 53 | 18.0 | 4 | 1 | 0 | 128 | 152.0 | 23 | 22 | 7 | |
| 81 | 18.0 | 3 | 0 | 0 | 83 | 158.8 | 35 | 1 | 0 | |
| 112 | 18.0 | 0 | 0 | 0 | 103 | 167.0 | 35 | 12 | 10 | |
| 13 | 18.2 | 0 | 0 | 0 | 104 | 177.0 | 22 | 5 | 7 | |
| 101 | 18.4 | 4 | 1 | 0 | 44 | 203.6 | 30 | 23 | 13 | |
| 34 | 18.8 | 1 | 0 | 0 | 70 | 218.0 | 57 | 19 | 26 | |
| 63 | 19.8 | 1 | 1 | 0 | 122 | 248.4 | 49 | 11 | 25 | |
| 78 | 20.0 | 6 | 1 | 0 | 12 | 296.2 | 31 | 14 | 13 | |
| 36 | 21.0 | 4 | 0 | 0 | 91 | 319.0 | 19 | 10 | 8 | |
| 84 | 22.0 | 2 | 1 | 0 | 38 | 372.6 | 28 | 16 | 22 | |
| 40 | 23.2 | 2 | 5 | 0 | 10 | 411.6 | 58 | 5 | 0 | |
| 73 | 25.6 | 3 | 0 | 0 | 56 | 432.2 | 25 | 13 | 35 | |
| 57 | 26.0 | 3 | 5 | 0 | 42 | 516.4 | 41 | 23 | 34 | |
| 76 | 28.0 | 3 | 1 | 0 | 3 | 618.7 | 56 | 25 | 2 | |
| 8 | 29.6 | 5 | 0 | 0 | 116 | 600.0 | 43 | 17 | 18 | Failures |
| 28 | 30.0 | 6 | 2 | 0 | 25 | 635.0 | 23 | 27 | 19 | |
| 67 | 30.0 | 4 | 4 | 0 | 20 | 682.8 | 44 | 38 | 93 | |
| 23 | 33.0 | 4 | 2 | 0 | | | | | | |
| 114 | 34.4 | 6 | 0 | 0 | | | | | | |
| 93 | 35.0 | 9 | 1 | 0 | | | | | | |
| 129 | 35.0 | 6 | 0 | 0 | | | | | | |
| 21 | 35.4 | 3 | 3 | 0 | | | | | | |
| 7 | 36.0 | 10 | 1 | 0 | | | | | | |
| 124 | 47.0 | 4 | 2 | 0 | | | | | | |
| 9 | 48.0 | 6 | 9 | 2 | | | | | | |
| 125 | 51.4 | 5 | 4 | 1 | | | | | | |
| 24 | 53.0 | 8 | 7 | 0 | | | | | | |
| 29 | 53.6 | 8 | 8 | 2 | | | | | | |
| 89 | 56.2 | 16 | 2 | 0 | | | | | | |

*Construction Test B—Arranged in Order of Time of Solution.*

| Subjects' Institution Number | Time Score in Seconds | Additional Moves. | Impossible Moves. | Repetition of Impossible Moves. | Character of Performance |
|---|---|---|---|---|---|
| 87* | 18.0 | 0 | 0 | 0 | Good |
| 9* | 20.0 | 6 | 0 | 0 | " |
| 102 | 20.0 | 20 | 8 | 0 | Queer combination of insight and lack of it |
| 32 | 29.0 | 0 | 0 | 0 | Good |
| 76 | 30.0 | 4 | 0 | 0 | " |
| 117 | 31.0 | 0 | 0 | 0 | " |
| 31 | 31.4 | 0 | 0 | 0 | " —Hurried |
| 72 | 33.0 | 5 | 1 | 0 | " |
| 82 | 34.0 | 0 | 0 | 0 | " |
| 5 | 38.0 | 2 | 0 | 0 | " |
| 52 | 39.0 | 4 | 0 | 0 | " |
| 93 | 39.2 | 2 | 0 | 0 | " |
| 106 | 39.6 | 2 | 0 | 0 | |
| 95 | 41.0 | 2 | 0 | 0 | " |
| 111 | 42.0 | 3 | 0 | 0 | " |
| 7 | 43.0 | 1 | 0 | 0 | " |
| 66 | 46.0 | 3 | 0 | 0 | " |
| 10 | 47.8 | 0 | 0 | 0 | " |
| 53* | 50.4 | 10 | 0 | 0 | " |
| 16 | 52.8 | 6 | 0 | 0 | " |
| 89 | 57.0 | 3 | 0 | 0 | " |
| 36 | 60.0 | 4 | 0 | 0 | |
| 51* | 60.0 | 18 | 0 | 0 | " |
| 34 | 61.0 | 6 | 0 | 0 | " |
| 45 | 62.4 | 7 | 1 | 0 | " |
| 123* | 66.0 | 12 | 0 | 0 | " |
| 55 | 71.2 | 5 | 0 | 0 | " |
| 115* | 73.6 | 14 | 0 | 0 | Quite good |
| 57 | 75.2 | 12 | 0 | 0 | " " |
| 23 | 76.4 | 13 | 0 | 0 | " " |
| 12 | 80.0 | 11 | 1 | 0 | " " |
| 90 | 85.0 | 2 | 0 | 0 | Good |
| 114* | 85.4 | 3 | 0 | 0 | Very good |
| 14 | 86.8 | 15 | 0 | 0 | |
| 124* | 88.0 | 8 | 0 | 0 | Good |
| 63 | 93.0 | 9 | 2 | 0 | Good on the whole |
| 108* | 97.6 | 8 | 0 | 0 | Slow but good |
| 24* | 97.8 | 14 | 3 | 0 | Fair |
| 78 | 98.0 | 29 | 3 | 0 | Slow but fair |
| 13 | 101.0 | 4 | 0 | 0 | Good |

| | | | | | |
|---|---|---|---|---|---|
| 109 | 110.2 | 17 | 3 | 0 | Fairly good |
| 33 | 114.6 | 23 | 3 | 0 | Only fair |
| 71 | 114.6 | 10 | 0 | 0 | Good |
| 30 | 116.8 | 17 | 0 | 0 | " |
| 26 | 118.6 | 13 | 1 | 0 | Fair |
| 91* | 118.8 | 8 | 0 | 0 | Pretty good |
| 125 | 122.8 | 34 | 0 | 0 | Fair |
| 94 | 126.8 | 32 | 0 | 0 | " |
| 42* | 131.6 | 17 | 0 | 0 | " |
| 67 | 135.0 | 25 | 8 | 0 | Only fair |
| 74 | 145.4 | 24 | 2 | 0 | Slow but fair |
| 112* | 146.6 | 34 | 2 | 0 | Fair but not quick to see |
| 84 | 156.0 | 34 | 0 | 0 | Confused but fair |
| 83 | 160.6 | 35 | 0 | 0 | Only fair |
| 129 | 166.0 | 34 | 0 | 0 | Peculiar but fair. (Insane) |
| 81* | 196.2 | 46 | 6 | 0 | Poor perfectly blind |
| 104* | 199.0 | 30 | 2 | 2 | Not even trial and error; |
| 73 | 209.4 | 5 | 0 | 0 | Morphine habit; erratic |
| 2 | 220.6 | 29 | 0 | 0 | Fair |
| 101* | 223.6 | 45 | 3 | 1 | Blind except for short intervals when method was fair |
| 22* | 227.6 | 17 | 6 | 3 | Poor |
| 3 | 229.0 | 17 | 2 | 0 | " |
| 28 | 232.0 | 46 | 0 | 0 | Fair |
| 64* | 250.4 | 42 | 3 | 0 | Very poor |
| 29* | 255.0 | 64 | 4 | 0 | Haphazard but finally saw |
| 8* | 278.4 | 48 | 1 | 5 | Morph. habit evident; erratic, and haphazard |
| 97 | 292.6 | 76 | 1 | 0 | Fair, slow to see |
| 100 | 294.0 | 50 | 0 | 0 | Slow to see |
| 127* | 294.8 | 73 | 0 | 0 | Slow and dull |
| 20* | 301.2 | 50 | 10 | 4 | Not even trial and error |
| 103 | 309.6 | 60 | 20 | 0 | " " " " " |
| 69 | 330.0 | 65 | 4 | 0 | Fair. |
| 44* | 372.0 | 216 | Many | | Not even trial and error. |
| 70 | 390.0 | 65 | 4 | 2 | Blind in spots. |
| 116* | 433.0 | 69 | 5 | 0 | Poor but not absolutely blind. |
| 18* | 443.6 | 66 | 8 | 2 | |
| 40* | 506.0 | 37 | 6 | 2 | Trial and error. |
| 21 | 553.0 | 33 | 2 | 0 | " " " |
| 65* | 900.0 | 38 | Many | | Blind in spots. |
| 56* | 900.0 | 113 | " | | Not even trial and error. |
| 39 | 900.0 | 116 | " | | " " " " " |
| 25 | 900.0 | 117 | " | | " " " " " " |
| 128 | 900.0 | 122 | " | | " " " " " " |
| 35* | 900.0 | 135 | " | | " " " " " " |
| 38* | 900.0 | 155 | " | | " " " " " " |
| 85* | 900.0 | 160 | " | | " " " " " " |
| 92* | 900.0 | 241 | " | | " " " " " " |
| 82* | 900.0 | 239 | " | | " " " " " " |

# CHAPTER III

## Experimental Data and Results

### Section I. Height

*Materials:* Stadiometer and milimeter rule.

*Method of Measurement:* As a usual thing in the Bedford laboratory height was measured the subject's shoes removed. This method was not feasible in the Cincinnati laboratory, and so with the Bedford 88 we followed their method of not removing the subject's shoes. The height recorded is the height in shoes minus the height of the heel measured in millimeters with rule or calipers. For the rest the Cincinnati procedure differed in no way from our own routine.

The subjects stood erect, heels, shoulders and head in contact with the rod. Combs in the way were removed and the hair taken down if it was worn on the top of the head. Care was taken that the head was held in a normal position. The sliding rod was then brought down to rest easily but firmly on the head and the reading made.

Sitting height, the subject sat erect on the platform of the stadiometer with spine and head well back against the measuring rod. Both heights were recorded in centimeters.

TABLE 1

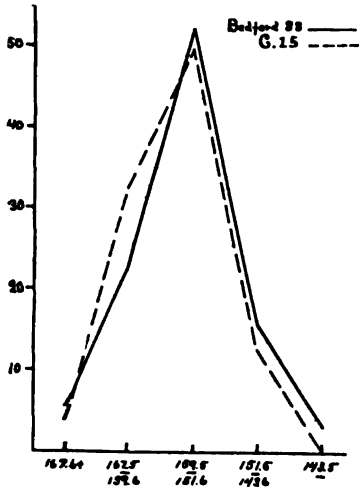
Height, in Cm.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-Year-Old Working Girls

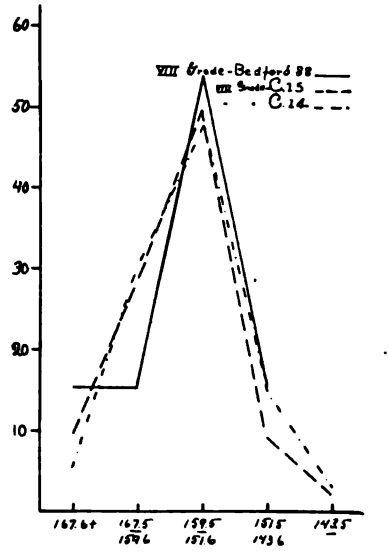
| Group* | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 160.4 | 156.1 | 152.3 | 4.3 | 3.8 | 173.5 | 138.4 |
| C. 15 | 161.6 | 157.5 | 153.6 | 4.1 | 3.9 | 174.7 | 142.0 |
| C. 14 | 159.0 | 155.0 | 150.5 | 4.0 | 4.5 | 170.0 | 137.2 |
| Retarded C. 14† | | | | | | | |
| Retarded C. 15† | | | | | | | |
| Below-Grade Group | 158.4 | 153.6 | 152.0 | 4.8 | 1.6 | 164.5 | 138.4 |
| Grade Group | 165.0 | 157.4 | 152.4 | 7.6 | 5.0 | 173.5 | 140.5 |
| Vth Grade | 166.0 | 156.5 | 153.2 | 9.5 | 3.3 | 169.5 | 152.3 |
| VIth Grade | 162.1 | 156.1 | 153.0 | 6.0 | 3.1 | 166.8 | 141.8 |
| VIIth Grade | 165.3 | 159.0 | 151.5 | 6.3 | 7.5 | 173.0 | 140.5 |
| VIIIth Grade | 160.1 | 158.4 | 154.5 | 1.7 | 3.9 | 173.5 | 149.7 |

* For the definition of these groups see pages 23 and 24.

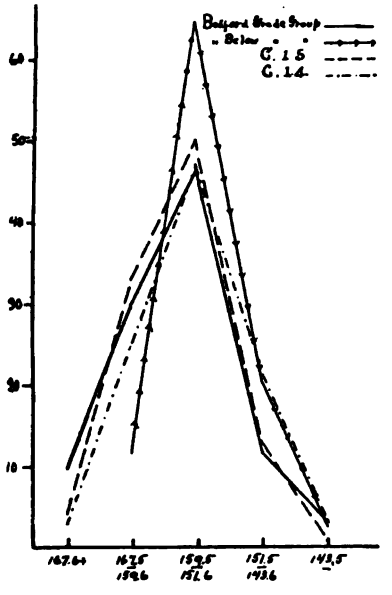
† We have not the data necessary to compute the percentiles in height of this group.



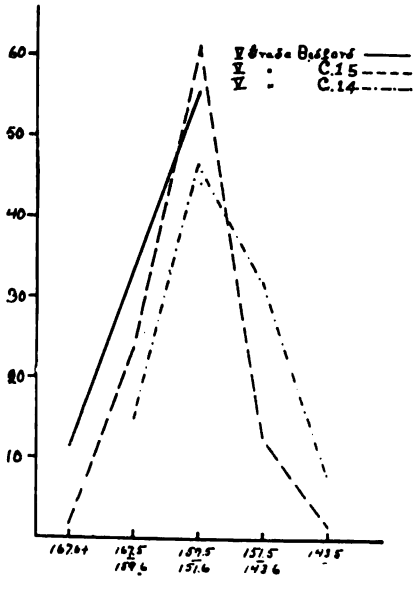

CURVE 1.—Bedford 88 and C. 15




CURVE 3.—Bedford VIIIth Grade, C. 15 and C. 14 VIIIth Grade




CURVE 2.—Grade Group, Below Grade Group, C. 15 and C. 14




CURVE 4.—Bedford Vth Grade, C. 15 and C. 14 Vth Grade

HEIGHT

*Results*: The members of the Reformatory group are on the whole slightly shorter in height than the Cincinnati working girl of 15 years (see Curve 1). There is among them, however, no individual who is as short as the shortest working girl of C. 14,[1] *i. e.*, 137.2 cm. If the Bedford 88 are divided into two groups according as they had or had not reached as advanced a grade upon leaving school as the working children, the Grade Group, with its equivalent schooling, are 6.6 cm. taller than the others, the Below-Grade Group at the 25th percentile, 3.8 cm. taller in median height, and 0.4 cm. taller at the 75th percentile. This Grade Group is taller than C. 15 only at the 25th percentile.

The Bedford 5th Grade is distinctly taller than the working girl of the same grade (see Curve 4). Curiously enough, at the 25th percentile the Bedford 5th Grade is taller than the Bedford 8th Grade—a fact to be remembered when considering the results of certain of the mental tests that follow.

Sitting height has not been tabulated for the working children up to date. We have compiled Table 2, which gives the distribution of the Grade Group and the Below-Grade Group with respect to standing height and sitting height in terms of the norms established by the Child Study Department of the Chicago Public Schools.[2] These norms were established by arranging all the measurements for each age in the order of their increasing height. The shortest record was called 0; the others were divided into ten numerically equal sections, 0-10, 10-20, 20-30, etc., percentile groups, respectively. The highest record of each of these groups was then recorded as the 10th, 20th, etc., percentile. Accordingly, 40–50 contains the median record, 70–80 the 25th percentile, and 20–30 the 75th percentile record. The normal distribution of our records, then, after each has been referred to a table of her own age, might be expected to put 10 per cent. in each of the ten divisions of 0–10, 20–30, 30–40, etc., and not more than one record at zero. We have added two divisions at the extremes of the percentile scale for those of

[1] For the definition of this and the following group abbreviations, see p. 23.

[2] Child Study Report No. 3 of the Department of Child Study, 1903, by Fred Warren Smedley, Chicago, pp. 23–25.

our subjects who were taller than the 100th percentile record of the normal subjects and "Below 0" for those who were shorter than the standard zero record.

TABLE 2.

The Distribution of the Height of 88 Reformatory Subjects with Respect to the Various Percentile Groups under which they come in Smedley's Tables of Normal Individuals of Corresponding Ages

| Smedley's Percentile Distribution | Height Standing | | | | Height Sitting | | | |
|---|---|---|---|---|---|---|---|---|
| | Grade-Group | | Below-Grade Grade | | Grade-Group | | Below-Grade Grade | |
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| Above 100 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 90–100 | 6 | 11.1 | 0 | 0.0 | 2 | 3.7 | 0 | 0.0 |
| 80–90 | 6 | 11.1 | 0 | 0.0 | 5 | 9.3 | 1 | 2.9 |
| 70–80 | 3 | 5.6 | 1 | 2.9 | 4 | 7.4 | 1 | 2.9 |
| 60–70 | 2 | 3.7 | 1 | 2.9 | 3 | 5.6 | 2 | 5.9 |
| 50–60 | 1 | 1.8 | 1 | 2.9 | 6 | 11.1 | 1 | 2.9 |
| 40–50 | 5 | 9.3 | 4 | 11.8 | 4 | 7.4 | 4 | 11.8 |
| 30–40 | 3 | 5.6 | 4 | 11.8 | 7 | 12.9 | 4 | 11.8 |
| 20–30 | 6 | 11.1 | 4 | 11.8 | 4 | 7.4 | 6 | 17.7 |
| 10–20 | 6 | 11.1 | 6 | 17.7 | 6 | 11.1 | 5 | 14.7 |
| 0–10 | 16 | 29.6 | 12 | 35.3 | 10 | 18.5 | 9 | 26.5 |
| 0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Below 0 | 0 | 0.0 | 1 | 2.9 | 3 | 5.6 | 1 | 2.9 |
| Total | 54 | | 34 | | 54 | | 34 | |
| 25th Percentile | 70–80 | | 30–40 | | 60–70 | | 40–50 | |
| Median | 20–30 | | 10–20 | | 30–40 | | 20–30 | |
| 75th Percentile | 10–20 | | 0–10 | | 10–20 | | 0–10 | |

Table 2 shows the Reformatory women to be distinctly below the normal in height sitting and standing. They are ten per cent. nearer the standard height sitting than standing which means that they are disproportionately long waisted. The Grade Group are slightly taller than the Below-Grade Group at the 75th and median record points; they are decidedly taller at the 25th percentile. One third of this group are above the median height for normal persons of their own age, but 51 per cent. of them are no taller than the shortest 30 per cent. of the

normal group. Of the Below Grade Group only 7.8 per cent. are above the median normal height and 67.7 are no taller than the shortest 30 per cent. 55.9 per cent. of them are no taller than the shortest 20 per cent. of normal individuals of corresponding age.

In the Grade Group there is no individual taller than the tallest normal individual and in the Below-Grade Group the tallest individual is at the 80th percentile record point of the normal series.

### Section 2. Weight

*Materials:* The Standard anthropometric scale recommended in Whipple's manual.

*Method of Measurement:* Here again the Cincinnati procedure did not differ from that already in use at Bedford. The weight was taken with the subject clothed. Our subjects were weighed in institution clothes, which are of proportionally equal weight for all. The weight was read to twentieths of a kilogram.

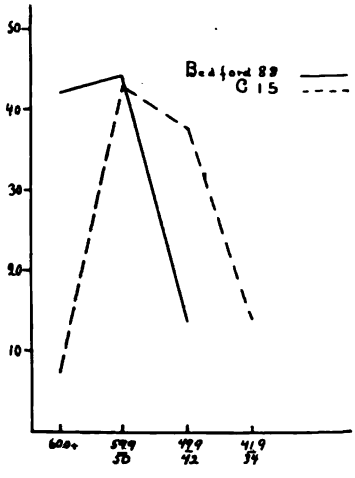
TABLE 3.

Weight, in Kg.

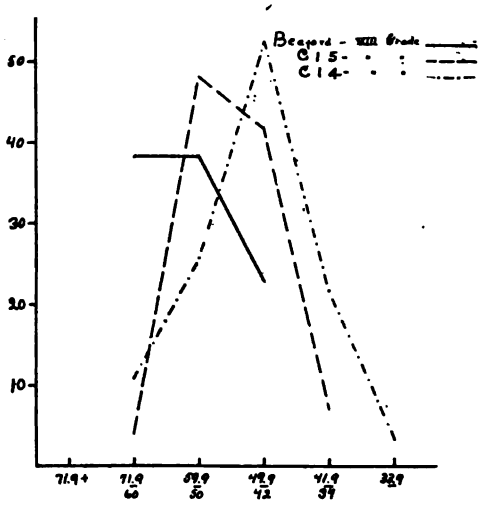
Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 63.7 | 58.8 | 53.3 | 4.9 | 5.5 | 101.6 | 42.5 |
| C. 15 | 54.0 | 49.1 | 44.8 | 4.9 | 4.3 | 95.0 | 34.9 |
| C. 14 | 49.7 | 45.4 | 40.2 | 4.3 | 5.2 | 86.3 | 29.5 |
| Retarded C. 14* | | | | | | | |
| Retarded C. 15* | | | | | | | |
| Below-Grade Group | 63.0 | 59.3 | 55.5 | 3.7 | 3.8 | 78.5 | 42.5 |
| Grade Group | 64.2 | 58.1 | 52.9 | 6.1 | 5.2 | 101.6 | 43.6 |
| Vth Grade | 76.5 | 66.2 | 61.9 | 10.3 | 4.3 | 79.2 | 53.6 |
| VIth Grade | 62.0 | 56.8 | 52.9 | 5.2 | 3.9 | 75.4 | 43.6 |
| VIIth Grade | 61.3 | 56.1 | 51.5 | 5.2 | 4.6 | 101.6 | 45.0 |
| VIIIth Grade | 63.7 | 57.3 | 52.7 | 6.4 | 4.6 | 71.7 | 44.0 |

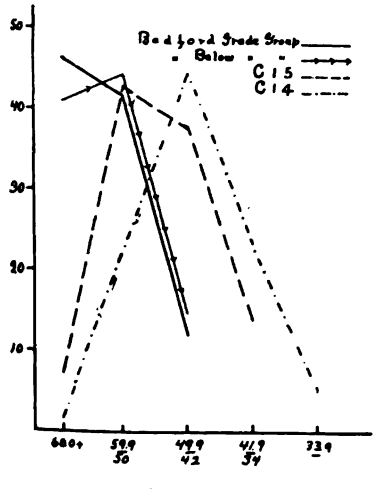
*We have not the data necessary to compute the percentiles of these groups in this test.



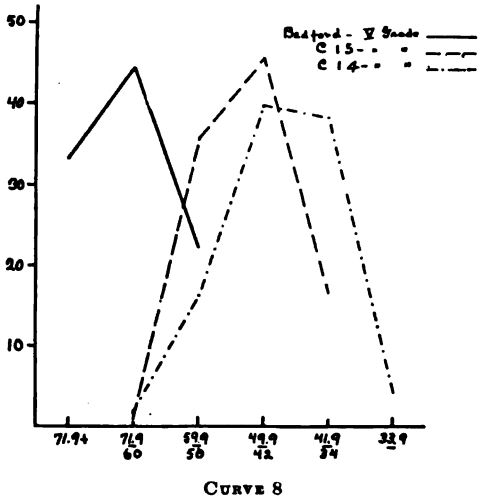

CURVE 5




CURVE 7




CURVE 6




CURVE 8

WEIGHT

*Results*: The Reformatory women are decidedly heavier than the 15-year-old working girl. They are 9.7 kg. heavier at the 25th percentile, 9.7 kg. at the median and 8.5 kg. at the 75th percentile. The subject whose weight was least of all was 7.6 kg. heavier than the lightest working girl of fifteen.

There is a tendency for the Below-Grade Group to be slightly heavier than the Grade Group, and the 5th Grade is decidedly heavier than the 8th. The weight of the latter exceeds that of the former by 12.8 kg., 8.9 kg. and 9.2 kg. at the three percentile records. This, of course, means a negative correlation with grade in the case of the Reformatory group, whereas the correlation for the Cincinnati working children was a positive one. This negative correlation does not maintain throughout. The 6th and 7th Grades are slightly less heavy than the 8th, but the differences are less than in the case of the corresponding standard grade groups.

The Below-Grade and the 5th Grade are conspicuously heavier —over 10 kg.—than C. 15.

Since the Reformatory subjects are older than the working girls, it is natural that they should exceed them in weight; it does not follow, however, that their weight is normal for their age. To determine this the weight of each girl was referred to the Smedley[1] tables of percentiles for normal groups of the same age. The number and per cent. that come within each of the various normal percentile groups are given in Table 4. Instead of an even distribution of one-tenth of the records at each percentile point, with but few exceptions our subjects are very much heavier than the average individual of their own age. The distribution is even less normal for the Below, than for the Grade Group. About 75 per cent. of the Grade Group are heavier than the median of normal weight; over 80 per cent. of the Below-Grade Group are heavier than the median of normal weight.

[1] *Ibid.* pp. 23–25.

TABLE 4.

The Distribution of the Weight of 88 Reformatory Subjects with Respect to the Various Percentile Groups under which they come in Smedley's Tables of Normal Individuals of Corresponding Age.

| Smedley's Percentile Distribution | Grade-Group | | Below-Grade Grade | |
|---|---|---|---|---|
| | No. | Per Cent. | No. | Per Cent. |
| Above 100 | 1 | 1.8 | 0 | 0.0 |
| 90–100 | 18 | 33.3 | 10 | 29.4 |
| 80–90 | 9 | 16.7 | 11 | 32.4 |
| 70–80 | 7 | 12:9 | 3 | 8.8 |
| 60–70 | 3 | 5.6 | 2 | 5:9 |
| 50–60 | 0 | 0.0 | 1 | 2.9 |
| 40–50 | 9 | 16.7 | 3 | 8.8 |
| 30–40 | 0 | 0.0 | 0 | 0.0 |
| 20–30 | 2 | 3.7 | 1 | 2.9 |
| 10–20 | 2 | 3.7 | 2 | 5.9 |
| 0–10 | 3 | 5.6 | 1 | 2.9 |
| 0 | 0 | 0.0 | 0 | 0.0 |
| Below 0 | 0 | 0.0 | 0 | 0.0 |
| Total | 54 | | | |
| 25th Percentile | 90–100 | | 90–100 | |
| Median | 80– 90 | | 80– 90 | |
| 75th Percentile | 40– 50 | | 60– 70 | |

### Section 3. Strength of Grip

*Materials:* A Smedley Dynamometer.

*Method of Measurement:* The Cincinnati procedure in this test, as in the two preceding, is practically identical with that already in use at Bedford. Dr. Woolley's directions were: "The experimenter showed the instrument to the child, and then proceeded about as follows: 'This instrument is to measure how strong your hand is. I will show you how it works. I take it in my hand this way (holding it down at the side) and then squeeze just as hard as I can. The harder I squeeze, the farther those pointers move on the scale, and one of them stays in place when I let go to show how hard I have squeezed. See? Now hold out your hand and let me see how big it is. (Adjust the instrument roughly to the size of the child's hand.) Now you take it. Hold it down at your side, and see how hard you can squeeze.' The experimenter watched the child closely, and if he saw him pushing against his side with the instrument, he warned him not to do so again, and discarded that reading."

We ordinarily said: "This is something that is used in gymnasiums to tell people how strong they are. Let's see how strong *you* are! First we must make the handle fit your hand (adjusts it). Now take it in your hand like this (experimenter illustrates) and hold it down by your side like this. Don't

press it up against your side, just squeeze it with your hand. The harder your squeeze the farther around these little hands will go and one of them will stay out there after you let go to show us how strong you are. Alright, now you take it and give it the very hardest grip you can." It proved safer not to say "instrument," after the standard directions, because so many of the Reformatory women were afraid of strange machines as a result of electrical shocks received at Coney Island. It is just as well, too, with defectives, to warn them explicitly not to press the instrument up against their side. Otherwise too many trials have to be discarded. After each trial we said "Good! Now again!" In both the Cincinnati and the Bedford laboratories the two hands were tested alternately, three times each. The percentiles *etc.*, are based on the best of the three readings.

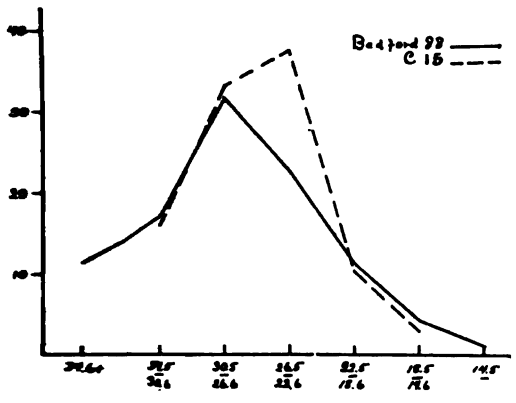
*Results*: In strength of grip with the right hand the Reformatory subjects exceed the working girl of 15 by 2.1 kg. at the median records and by 3. and 1.8 kg. at the 25th and 75th percentiles. The Grade Group is stronger than the Below-Grade Group by 2., 1.7 and 1. kg. at the three percentiles respectively, but even the Below-Grade Group excel the working girl of 15. The general shape of the curve of the Below-Grade Group is

TABLE 5.

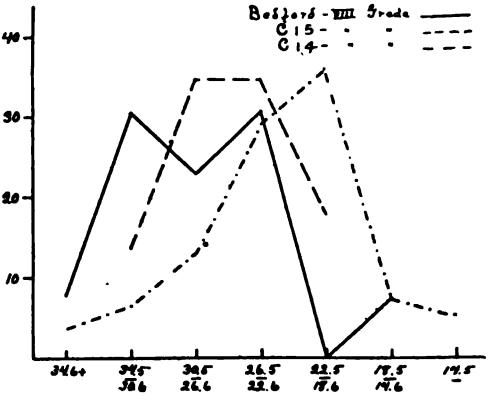
STRENGTH OF GRIP, IN KG.—RIGHT HAND.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls

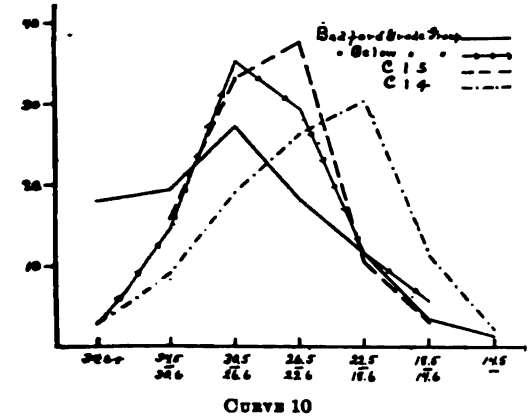
| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 31.7 | 28.0 | 25.0 | 3.7 | 3.0 | 41.0 | 9.5 |
| C. 15 | 28.7 | 25.9 | 23.2 | 2.8 | 2.7 | 35.0 | 13.0 |
| C. 14 | 26.4 | 22.7 | 19.8 | 3.7 | 2.9 | 37.0 | 9.0 |
| Retarded C. 14 | 27.0 | 23.0 | 20.0 | 4.0 | 3.0 | 33.0 | 9.0 |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 30.0 | 27.0 | 25.0 | 3.0 | 2.0 | 35.0 | 15.0 |
| Grade Group | 32.0 | 28.7 | 26.0 | 3.3 | 2.7 | 41.0 | 9.5 |
| Vth Grade | 35.0 | 31.0 | 26.5 | 4.0 | 4.5 | 41.0 | 19.5 |
| VIth Grade | 31.5 | 28.7 | 25.5 | 2.8 | 3.2 | 36.0 | 18.0 |
| VIIth Grade | 31.5 | 27.5 | 25.0 | 4.0 | 2.5 | 39.5 | 9.5 |
| VIIIth Grade | 32.0 | 27.0 | 26.5 | 5.0 | 0.5 | 39.0 | 18.5 |



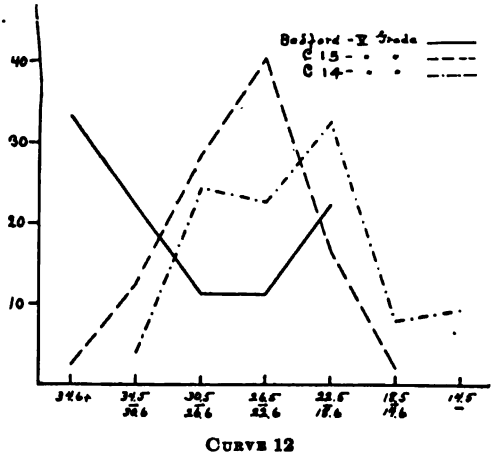

CURVE 9




CURVE 11




CURVE 10




CURVE 12

STRENGTH OF GRIP—RIGHT HAND

quite coincident with that of C. 15. (See Curve 10.) The 5th Grade is obviously stronger than the 8th Grade as it was taller and heavier. (See Percentiles.)

The same relative differences characterize the various groups in the strength of grip with the left hand, except that they approximate more nearly to the records of the standard group. Our whole group of subjects are still consistently superior to the 15-year-old girl and the 5th Grade is still superior to the 8th. There is one record in the left grip among the Bedford Group that is lower than the poorest record of the 15-year-old girls. All the other records, however, are markedly better than the lowest of the working children at 15.

TABLE 6.

STRENGTH OF GRIP, IN KG.—LEFT HAND.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 28.0 | 24.7 | 22.0 | 3.3 | 2.7 | 43.0 | 10.0 |
| C. 15 | 27.6 | 24.5 | 21.3 | 3.1 | 3.2 | 35.0 | 11.0 |
| C. 14 | 25.7 | 22.7 | 19.5 | 3.0 | 3.2 | 37.0 | 8.0 |
| Retarded C. 14 | 26.0 | 22.0 | 20.0 | 4.0 | 2.0 | 34.0 | 8.0 |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 28.0 | 24.5 | 21.5 | 3.5 | 3.0 | 33.0 | 14.0 |
| Grade Group | 28.5 | 25.0 | 22.0 | 3.5 | 3.0 | 43.0 | 10.0 |
| Vth Grade | 30.5 | 28.5 | 22.5 | 2.0 | 6.0 | 43.0 | 21.0 |
| VIth Grade | 27.0 | 24.7 | 22.0 | 2.3 | 2.7 | 34.5 | 17.5 |
| VIIth Grade | 28.7 | 26.2 | 22.7 | 2.5 | 3.5 | 32.0 | 10.0 |
| VIIIth Grade | 25.0 | 23.5 | 22.0 | 1.5 | 1.5 | 28.5 | 21.0 |

Table 7 shows the number and per cent. of subjects whose grip is high, low or average as compared with the normal records of corresponding age.[1] Each of the Bedford 88 was referred to the Smedley table for her age and a record made of the normal percentile group in which her grip fell. In strength of grip of the right hand nearly 60 per cent. of the Grade Group are no better than the poorest 30 per cent. of normal subjects; nearly 75 per cent. of the Below-Grade Group are as poor as the weakest 30 per cent. of the normal subjects; in strength of grip left hand nearly 81.5 per cent. of the Grade Group are poorer than the median of the normal group, 66.7 per cent. are as poor as the lowest 30 per cent. of the normal group, and 75 per cent. of the Below-Grade Group are as weak as the weakest 30 per cent. of the normal group. Accordingly, though they are absoultely stronger than the working girl of 15, a very high per cent. of them are below what is the normal strength of grip for their age.

TABLE 7.

The Distribution of the Strength of Grip of 88 Reformatory Subjects with Respect to the Various Percentile Groups under which they come in Smedley's Tables of Normal Individuals of Corresponding Age

| Smedley's Percentile Distribution | Grip Right | | | | Grip Left | | | |
|---|---|---|---|---|---|---|---|---|
| | Grade Group | | Below-Grade Group | | Grade Group | | Below-Grade Group | |
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| Above 100 | 0 | 0.0 | 0 | 0.0 | 1 | 1.8 | 0 | 0.0 |
| 90–100 | 2 | 3.7 | 0 | 0.0 | 1 | 1.8 | 0 | 0.0 |
| 80–90 | 1 | 1.8 | 0 | 0.0 | 1 | 1.8 | 1 | 2.9 |
| 70–80 | 4 | 7.4 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 60–70 | 4 | 7.4 | 2 | 5.9 | 3 | 5.6 | 0 | 0.0 |
| 50–60 | 3 | 5.6 | 3 | 8.8 | 4 | 7.4 | 3 | 8.8 |
| 40–50 | 2 | 3.7 | 2 | 5.9 | 6 | 11.1 | 2 | 5.9 |
| 30–40 | 7 | 12.9 | 2 | 5.9 | 2 | 3.7 | 2 | 5.9 |
| 20–30 | 5 | 9.3 | 3 | 8.8 | 4 | 7.4 | 6 | 17.7 |
| 10–20 | 5 | 9.3 | 7 | 20.6 | 9 | 16.7 | 4 | 11.8 |
| 0–10 | 16 | 29.6 | 11 | 32.3 | 20 | 37.0 | 12 | 35.3 |
| 0 | 1 | 1.8 | 2 | 5.9 | 0 | 0.0 | 1 | 2.9 |
| Below 0 | 4 | 7.4 | 2 | 5.9 | 3 | 5.6 | 3 | 8.8 |
| Total | 54 | | 34 | | 54 | | 34 | |
| 25th Percentile | 50–60 | | 30–40 | | 40–50 | | 20–30 | |
| Median | 20–30 | | 10–20 | | 10–20 | | 10–20 | |
| 75th Percentile | 0–10 | | 0–10 | | 0–10 | | 0–10 | |

[1]Smedley tables *ibid.* pp. 23–25.

### Section 4. Steadiness of Hand

*Standard Method.* "*Materials:* Steadiness tester (see Whipple's *Manual*, Test 13, illustration and description), stop-watch, electric sounder, dry battery. The steadiness tester is a metal plate set in a frame which supports it at an angle of 45° to the surface of the table. The plate contains nine round holes, arranged in two rows, four in the upper row and five in the lower. They decrease in size from the left hand one in the top row, which is a half inch in diameter, to the right hand one in the lower row which is 7/64 of an inch (see Whipple, l. c.). The instrument has a binding post which is attached to a battery composed of three dry cells. The battery is attached at its other pole to one binding post of a telegraph sounder. To the other post of the sounder is attached a flexible wire, which leads to a metal pencil, having a wooden holder. The metal pencil is about the size and shape of an ordinary lead pencil, except that the metal rod projects two inches beyond the wooden holder.

"*Method of testing:* The child was so placed with reference to the table that his elbow was on a level with the surface of the table, and at such a distance from the instrument that when the pointer was held just inside one of the holes, the elbow was as far forward as the front surface of the body. The adjustments of height were made by means of a wooden platform large enough to hold the chair on which the child sat, and a series of wooden frames, each about an inch thick, which could be placed under it. The shorter the child, the more frames needed under the platform. The same device was used to adjust the height of the child to the tapping board, and to the card-sorting box.[1]

"When the child was correctly placed, the experimenter proceeded as follows: 'This is an instrument to measure the steadiness of your hand. When I put this metal pencil into one of these holes, and hold it still, (illustrates) nothing happens, but as soon as my hand moves a little and makes the pointer touch the side of the hole, it causes that click (illustrates). Now I want you to put the pencil straight into the middle of this hole (pointing to the fourth one—the smallest in the top row) and see how still you can hold it—how few clicks you can make. Now try it to let me see if you hold the pencil correctly (corrects any errors of position). Now that is correct. I will tell you when to put the pencil in, and when to take it out, and don't mind the first few clicks when you put the pencil in. They don't count, anyway.'

"The stop-watch was started as the pencil was placed in the hole, but contacts were not counted during the first three seconds. Contacts were counted for fifteen seconds, making eighteen seconds in all in which the pencil was held in each hole. The point arbitrarily selected as the limit of the child's capacity was the smallest hole in which not more than twelve contacts were made.

"It was necessary for the experimenter to watch the child very carefully during this test, since many errors were possible. Often, in spite of the preliminary warning, the pencil was put into the hole at an angle, and had to be straightened before the test could proceed. Sometimes it was withdrawn from the hole and held just barely in front of it instead of inside. Sometimes it was held against the side of the hole, thus causing a continuous contact, but only one sound. The same result could be accomplished by thrusting the pencil very far into the hole until it touched the back of the instrument. Each experimenter was trained to watch the child's hand continuously during the fifteen seconds of the test, except for necessary glances at the stop watch.

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[1] In our laboratory the tester was fastened on a little platform that was attached to the wall and that could be raised or lowered to give the required height. This introduced no difference save that it was easier to adjust.

If any of these errors occurred, the test was stopped, the error pointed out, and the same hole tried again later.

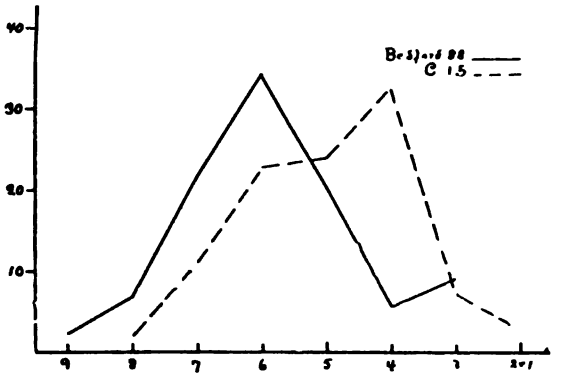
"The experimenter began each time with the fourth hole in the top row, using the child's right hand, and followed with a test of the left hand in the same hole. The hands were alternated throughout the test, and the instrument moved back and forth across the table to bring the required hole opposite the hand to be tested. If more than twelve contacts were made in the fourth hole, the next trial was given in the third hole—a larger one. If the number of contacts was less than thirteen, but more than three, the next trial was given in the fifth hole—a smaller one. If the number of contacts was three or less, the fifth hole was omitted and the next trial was given in the sixth hole. The object in omitting a hole in case the number of contacts was very small, was to equalize the fatigue effects. In case there was a sudden jump in the number of contacts made, or some disturbance occurred which affected a given test, the same hole was tried once more. If everything went smoothly, and the progression from hole to hole was normal, each hole was tried but once with each hand.

"*Criticisms*: The chief source of error in this piece of apparatus is that very light touches are sometimes not registered, either because one of the metal surfaces has become tarnished, or because the batteries begin to weaken. The inner surfaces of the holes and the metal pencil should be kept polished, and the batteries should be renewed every few months.

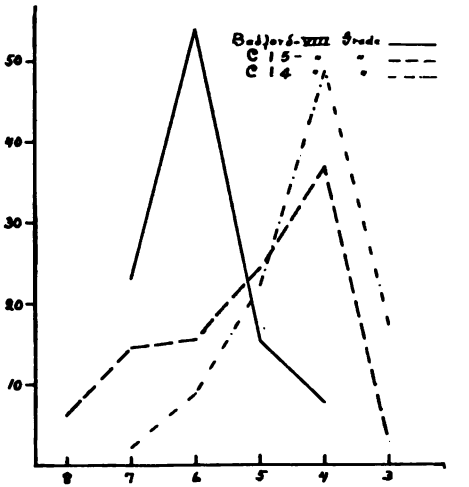
"*Method of dealing with results:* The results were recorded in terms of the smallest hole reached with each hand, and the number of contacts made in that hole—a number which was, according to the rule adopted, always twelve or less."

This test is difficult to explain so that the duller type of Bedford subject will remember all of the directions. In a preliminary series of tests it was found that they were more apt than not to jerk the pencil out when it began to click too fast to suit them, so we felt it wise to add this supplementary warning to the standard directions, "*No matter what* happens, or *how* many times it may click, do *not* take the pencil out until I tell you that you may do so."

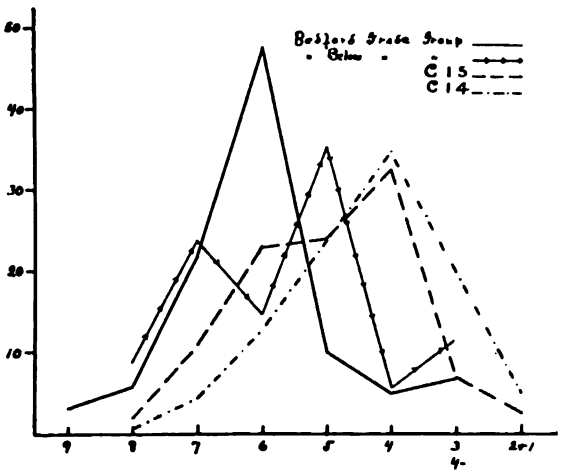
*Results:* The Reformatory women have greater steadiness of hand than the 15-year-old girl (see Curve 13). At all three percentiles the records show that they held the pencil as steadily or with even fewer contacts in the hole next smaller than the one which marks the same record of the working girl of 15. Both the upper and the lower limits are indicative of the greater steadiness of our subjects. The lowest score of the working girls is decidedly lower than the poorest record of the Bedford Below-Grade Group, and there is no record among them as good as the best Reformatory record. The Below-Grade Group is not inferior to the Grade Group at the 25th percentile; at the



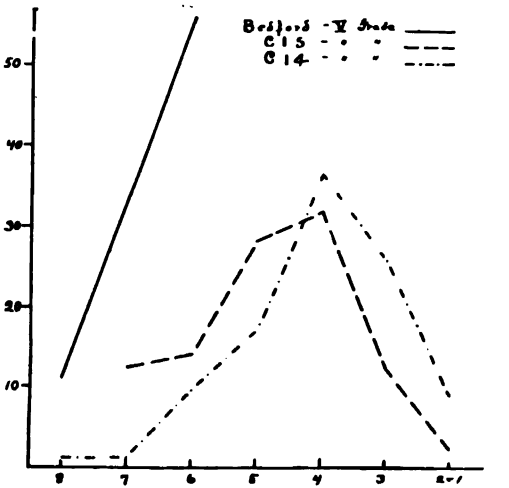
CURVE 13



CURVE 15



CURVE 14



CURVE 16

STEADINESS OF THE HAND. RIGHT

median and below it is poorer, but it is markedly superior to the C. 15 group at all three percentiles (see Curve 14).

The 5th Grade is conspicuously better than the same grade among the working girls and better than the 8th Grade of the Reformatory group (see Curves 15 and 16). Part of the greater

TABLE 8.

STEADINESS OF THE RIGHT HAND.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls.

| Group | 25th Percentile | | Median | | 75th Percentile | | Upper Limit | | Lower Limit | |
|---|---|---|---|---|---|---|---|---|---|---|
| | H | C | H | C | H | C | H | C | H | C |
| Bedford 88 | 7 | 10 | 6 | 7 | 5 | 9 | 9 | 4 | 4 minus | |
| C. 15 | 6 | 11 | 5 | 12 | 4 | 9 | 8 | 9 | 2 | 8 |
| C. 14 | 5 | 8 | 4 | 6 | 3 | 2 | 8 | 10 | 2 | 11 |
| Retarded C. 14 | 5 | 9 | 4 | 9 | 3 | 5 | 8 | 10 | 2 | 11 |
| Retarded C. 15 | | | | | | | | | | |
| Below-Grade Group | 7 | 10 | 5 | 2 | 5 | 11 | 8 | 8 | 4 minus | |
| Grade Group | 7 | 11 | 6 | 6 | 6 | 12 | 9 | 4 | 4 minus | |
| Vth Grade | 7 | 9 | 6 | 6 | 6 | 9 | 8 | 10 | 6 | 12 |
| VIth Grade | 6 | 3 | 6 | 10 | 4 | 5 | 8 | 7 | 4 minus | |
| VIIth Grade | 7 | 6 | 6 | 7 | 5 | 5 | 9 | 4 | 4 minus | |
| VIIIth Grade | 6 | 1 | 6 | 6 | 6 | 11 | 7 | 7 | 4 | 7 |

H = Number of Hole.
C = Number of Contacts.

success of our subjects over the standard group is doubtless due to the fact that they worked in an absolutely quiet room. Chiefly, it is because they are so phlegmatic; it is the result, too, of their dullness. For the most part they foresee no possibil-

ity of contacts and are spared the nervousness of anticipation. They do not *think* nor become apprehensive, and so they do not interfere with their muscular control, which, of course, by virtue of their greater maturity should be superior. Such as it is, it has a maximum opportunity to operate.

### Section 5. Rapidity of Movement.

*Standard Method.* "*Materials:* Tapping board (see Whipple's *Manual*, Test 10), electric enumerator, stop-watch.

"*Criticism:* The accuracy of recording contacts with an electric enumerator has been frequently questioned. We found our instrument accurate for any rate of speed which we obtained either from children or from adults.

"*Method of administering the test:* The child was adjusted with reference to the tapping board at such a height that, when sitting up straight on his chair, his forearm rested easily on the tapping board (for method of adjustment, see steadiness test). The experimenter then explained the test as follows: 'I want you to rest your arm on the board this way [does it] so that your arm touches the board all the way from the elbow to the wrist, and then see how fast you can tap with this instrument on this metal plate, this way, just moving your hand from the wrist [does it]. Do you see that pointer move once every time this pencil touches the plate, so that by watching it, I can tell how fast you are tapping? Now be sure not to lift your wrist from the board while you are tapping. Now you try it. [Child is allowed to tap a very few seconds —method criticized if wrong.] Now hold your hand all ready, and the instant I say "now," begin to tap, and tap just as fast as you possibly can until I tell you to stop.'

"The experimenter then took the reading of the dial, placed the stop-watch in his left hand, and gave the signal to start. He started the watch when the child's hand moved down for the first tap, and then took the readings of the dial when the second-hand passed the 15, 30, 45 and 60-second marks.

"*Criticisms*: This method of taking the readings is undoubtedly open to criticism. To read one moving point by another is a difficult and uncertain operation. None of the experimenters was allowed to give the test until he had had a period of practice, and had tested his ability by taking readings simultaneously with a skilled person. Because of these sources of error, small differences between one record and another cannot be considered significant, but large differences certainly are.

"*Method of dealing with results:* The number of taps for each quarter of a minute was obtained by subtracting each reading of the dial from the following one. The number of taps for the first and second half-minutes, and for the whole minute were then added up. As an index of fatigue we calculated what per cent. of the first fifteen seconds' taps had been lost in the last fifteen seconds. The justice of considering this value as an indication of the amount of fatigue, depends upon whether or not the individual being tested was really putting forth his best effort throughout the test. It is obviously impossible to be sure of this in any case. The instructions were given in a way designed to call out a maximum effort for speed, but of course not every child responded. There are even a few negative indices in the series. The defect is one common to all tests for fatigue."

TABLE 9.

TAPPING. NUMBER OF TAPS IN 30 SECONDS—RIGHT HAND.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 181 | 159 | 121 | 22 | 38 | 235 | 24 |
| C. 15 | 181 | 171 | 161 | 10 | 10 | 234 | 105 |
| C. 14 | 178 | 167 | 157 | 11 | 10 | 225 | 96 |
| Retarded C. 14 | 175 | 166 | 158 | 9 | 8 | 225 | 96 |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 160 | 136 | 102 | 24 | 34 | 188 | 24 |
| Grade Group | 185 | 175 | 152 | 10 | 23 | 235 | 65 |
| Vth Grade | 170 | 157 | 115 | 13 | 42 | 198 | 65 |
| VIth Grade | 181 | 169 | 149 | 12 | 20 | 195 | 83 |
| VIIth Grade | 194 | 179 | 145 | 15 | 34 | 235 | 72 |
| VIIIth Grade | 185 | 180 | 156 | 5 | 24 | 195 | 73 |

TABLE 10.

TAPPING. NUMBER OF TAPS IN 60 SECONDS—RIGHT HAND.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 349 | 310 | 252 | 39 | 58 | 452 | 48 |
| C. 15 | 345 | 325 | 305 | 20 | 20 | 440 | 201 |
| C. 14 | 338 | 315 | 297 | 23 | 18 | 430 | 216 |
| Retarded C. 14 | 333 | 314 | 297 | 19 | 17 | 430 | 216 |
| Retarded C. 15 | | | | | | | |
| * | | | | | | | |
| Below-Grade Group 2 | 320 | 293 | 272 | 27 | 21 | 412 | 43 |
| Below-Grade Group 1 | 303 | 270 | 224 | 33 | 46 | 393 | 48 |
| Grade Group 2 | 363 | 345 | 330 | 18 | 15 | 441 | 155 |
| Grade Group 1 | 362 | 334 | 295 | 28 | 39 | 452 | 135 |
| Vth Grade | 332 | 302 | 254 | 30 | 48 | 368 | 135 |
| VIth Grade | 352 | 318 | 278 | 34 | 40 | 377 | 204 |
| VIIth Grade | 373 | 345 | 308 | 28 | 37 | 452 | 158 |
| VIIIth Grade | 365 | 345 | 318 | 20 | 27 | 382 | 149 |

*For the Grade and Below-Grade Group opposite (1) are the percentiles based upon the first trial, opposite (2) those based upon the second trial.

TABLE 11.

TAPPING. NUMBER OF TAPS IN 30 SECONDS—LEFT HAND.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls.

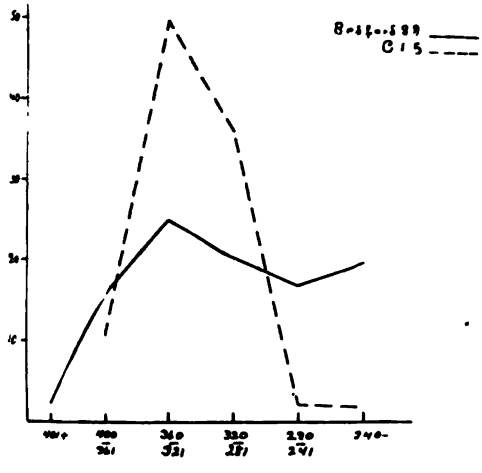
| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 162 | 147 | 123 | 15 | 24 | 208 | 20 |
| C. 15 | 156 | 144 | 132 | 12 | 12 | 201 | 91 |
| C. 14 | 153 | 139 | 127 | 14 | 12 | 198 | 86 |
| Retarded C. 14 | 151 | 138 | 128 | 13 | 10 | 198 | 94 |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 147 | 132 | 114 | 15 | 18 | 182 | 20 |
| Grade Group | 168 | 155 | 131 | 13 | 24 | 208 | 78 |
| Vth Grade | 153 | 131 | 102 | 22 | 29 | 162 | 85 |
| VIth Grade | 161 | 151 | 135 | 10 | 16 | 185 | 103 |
| VIIth Grade | 175 | 168 | 147 | 7 | 21 | 208 | 78 |
| VIIIth Grade | 168 | 160 | 130 | 8 | 30 | 179 | 93 |

TABLE 12.

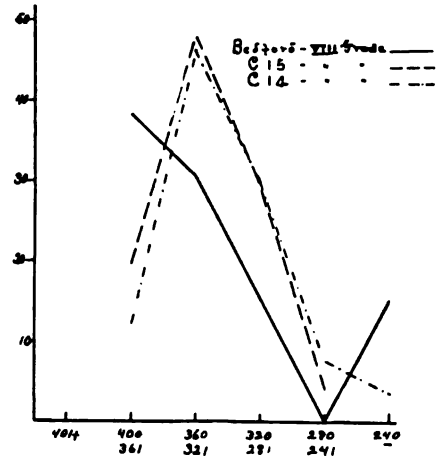
TAPPING. NUMBER OF TAPS IN 60 SECONDS—LEFT HAND.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 314 | 281 | 233 | 33 | 48 | 413 | 155 |
| C. 15 | 295 | 272 | 251 | 23 | 21 | 372 | 175 |
| C. 14 | 287 | 263 | 243 | 24 | 20 | 372 | 167 |
| Retarded C. 14 | 278 | 260 | 241 | 18 | 19 | 368 | 177 |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 277 | 262 | 223 | 15 | 39 | 355 | 43 |
| Grade Group | 321 | 295 | 260 | 26 | 35 | 413 | 155 |
| Vth Grade | 284 | 280 | 216 | 4 | 64 | 310 | 180 |
| VIth Grade | 301 | 290 | 260 | 11 | 30 | 348 | 203 |
| VIIth Grade | 324 | 320 | 278 | 4 | 42 | 413 | 155 |
| VIIIth Grade | 329 | 312 | 260 | 17 | 52 | 335 | 185 |




CURVE 17

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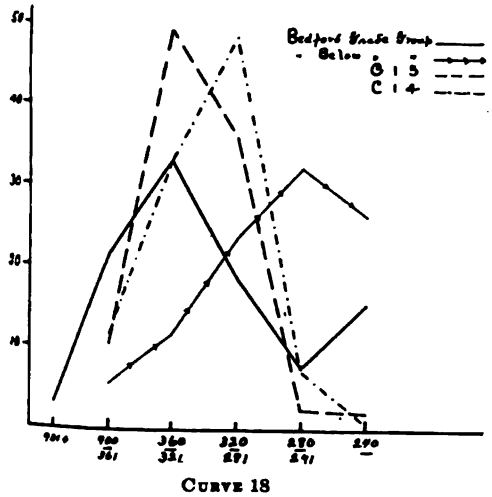
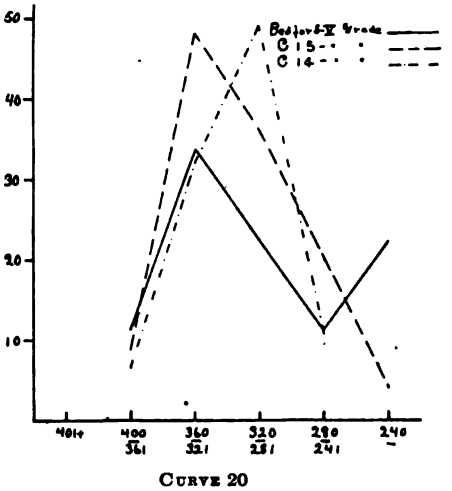



CURVE 18




CURVE 20

TAPPING. NUMBER OF TAPS IN ONE MINUTE—RIGHT HAND

*Results:* We illustrated the way to hold the stylus, place the arm, move only the wrist, etc., and we tapped once to show that the counter clicked and once again to show that the hand on the dial moved when the contact was made. We did not illustrate further letting the subject tap "a very few seconds." In this we evidently failed to carry out the standard method. Directions for our tests were built up from notes taken on a short visit to Cincinnati when Dr. Woolley had as yet no written formulation of the method in use. Under the circumstances it is not so surprising that this discrepancy should occur.

Perhaps this variation from the Standard Method was fortunate rather than otherwise, because it has thrown into relief how a direction that seems thoroughly clear to us may have little significance for our subjects. The direction—"*Tap-just-as-fast-as-you-possibly-can* until I tell you to stop"—seems almost as concrete and simple a direction as one could well give, yet the results show that to many of them it was an abstract request and curiously enough much less concrete than the request to sort cards as quickly as possible into four compartments (Test 6). They attacked the latter task with dispatch, whereas here they nearly all began to tap very slowly, often at a rate not faster than once a second. They were most painstaking and were apparently trying hard to do what was required. It was equally evident that they were puzzled and without any clear conception of what was desired. By the end of 30 sec. or a minute they were beginning to comprehend what it meant to tap quickly; by the end of the last quarter of the first minute many were tapping much faster than at the beginning.

This failure to appreciate at the outset the requirement to tap as fast as possible renders the indexes meaningless for many of them as indexes of fatigue. Equally high negative indexes result from tapping at a slow rate throughout the entire minute but tapping disproportionately slowly at the beginning, or from tapping at a fairly good rate all along but extremely fast at the end. The first is a record quite without value either as a measure of an individual's ability to tap or of her fatiguableness. The latter reveals an initial dullness of comprehension of what is required with a final realization and gives evidence of a high

degree of ability to tap rapidly. So it is we find that the majority of the high negative indexes of tapping with the right hand appear in the 8th-grade group on the one hand and in the Below-Grade Group on the other (see Table 14).

We have made the assumption that the lower numerical indexes are the better ones in the case of the standard group and that for the most part when the percentiles of the Bedford group correspond with the range of those of the standard group, we are getting actual indexes of fatigue. In the tabulation and interpretation of our records it was impossible to arrange the indexes of our subjects in the order of their merit, however, for we have no basis for estimating how much lower than the standard an index might be merely by virtue of the greater physical maturity of our subjects. The presumption is that there is an increase with age in the rapidity of tapping within definite limits and a decrease in the index of fatigue. As a

TABLE 13.

Absolute Differences Between the Percentile Records of the Bedford 88, Grade Group and Below-Grade Group and the Percentiles of the Cincinnati 15-year-old Working Girls.

| Differences Between the Percentiles of the Cin. 15-year-old Group and those of | | In No. Taps in 30", Rt. Hand* | In No. Taps in 60", Rt. Hand | In No. Taps in 30", Left Hand* | In No. Taps in 60", Left Hand |
|---|---|---|---|---|---|
| Total Bedford 88† | 25th Per. | 0 | + 4 | +12 | +19 |
| | Median | — 24 | —15 | + 6 | + 9 |
| | 75th Per. | — 80 | —53 | —18 | +18 |
| Grade Group | 25th Per. | + 8 | +17 | +24 | +26 |
| | Median | + 8 | + 9 | +22 | +23 |
| | 75th Per. | — 18 | —10 | — 2 | + 9 |
| Below-Grade Group | 25th Per. | — 42 | —42 | —18 | —18 |
| | Median | — 70 | —55 | —24 | —10 |
| | 75th Per. | —118 | —81 | —36 | —28 |

*The records have been multiplied by 2 to indicate the proportional number of taps that would have been the result had they continued to tap for the whole 60 seconds at the rate of the first 30 seconds.

†Plus signs indicate records among our subjects that are superior to the standard in rate of taps; minus signs those that are poorer.

matter of fact we did secure norms for the maximal rate of tapping for 60 seconds with the right hand for a second trial was given to each of the 88 from the 38th subject on. Index for maximal rate of tapping proves the Grade Group less fatiguable at the three percentiles by 4.3, 5.1, and 5.7 degrees respectively. Indexes for the Below-Grade Group are still somewhat anomalous. They are, 11.9, 8.1 and 0.0 at the three percentiles and differ from those from the C. 15 by $-.1 + 7.9$ and $+ 19.8$ respectively.

The fact that it is initial dullness which is the dominant factor controlling the characteristics of the Reformatory group and not absolute inability to tap rapidly, is shown clearly in Table 13. The differences in rate of tapping between the Reformatory group and the Cincinnati 15-year-old girls are for the most part greatest at all three percentiles in the number of taps in 30 sec. with the right hand. By the time our subjects have tapped to the end of the first minute a marked gain in almost every percentile has been made. Continuing to profit by the discovery that it is possible to tap quickly, there is a yet more marked approximation to the standard in the first 30 sec. tapping with the left hand. This approximation to the standard is continued for the better half of the Bedford 88 during the last 30 sec. tapping with the left hand. The record that was attained at the end of the first 30 sec. with the left hand by the Below-Grade Group is also improved upon to the end of the full minute's tapping with the left hand. Part of these increasing gains on the part of the left hand may be due to the tendency among these women to be ambidextrous. It is not due to a greater per cent. of left-handedness.

The 25th percentile of the Bedford 88 coincides in number of taps among the first 30 sec. tapping with the right hand with that of the C. 15; their median record is 24 and the 75th 80 taps slower than the standard. At these two last percentiles they are below both the 14-year-old and the retarded 15-year-old working girl. The Grade Group is superior to the Below-Grade Group by 25, 39, and 50 taps at the three percentiles and is better than the C. 15 group both at the 25th percentile and the median by 4 taps, whereas the Bedford Below-Grade Group is below the C. 15 by 21, 35 and 59 taps, respectively. By the

time they have tapped 30 sec. with the left hand, the Bedford 88 have surpassed the median of the C. 15 by 6 taps and have raised the 75th percentile from a deficit of 80 taps to a deficit of only 18 taps per minute. To the end, at the 75th percentile they fail to surpass the 14-year-old Retarded working girl. The Grade Group again shows its superiority by surpassing the C. 14 by 8 taps per minute at the 75th percentile and is but two taps per minute behind the C. 15 at the same percentile.

The standard curves are made only for the number of taps in 60 sec. with the right hand. Even there, the differences between the Grade and Below-Grade Group in ability to tap and to understand directions is evident (see Curve 18). Curves 19 and 20 indicate that the Bedford 8th grade resembles more nearly the 8th grade of the working girls than the Bedford 5th grade resembles the standard 5th grade. Percentile Tables 9, 10, 11, and 12 show clearly that in number of taps in 30 sec. and in 60 sec. with both the right and the left hand, each succeeding grade has a better record than the last. In 30 sec. with the right hand tapping, 75 per cent. of the Below-Grade Group were poorer than the 75th percentile of the 8th grade. That this was in part due to greater slowness to understand the method of the test and not to absolute inability to tap is shown by the fact that by the end of the 60 sec. tapping with the left hand 50 per cent. instead of 25 per cent. of them surpass the poorer quarter of the 8th grade as indicated by the 75th percentile.

The curves for indexes of tapping for 60 sec. with the right hand (see Curves 21, 22, 23, and 24) are chiefly of value to indicate how high a proportion of negative indexes there are as compared with the standard.

Another point of interest and one that is characteristic of the Reformatory group in other tests is the skewed distribution of the upper and the lower halves of the groups. Q. for the group of working children represents a fairly balanced measure of the variation above and below the median. For the Reformatory women the difference between the 75th and the median record is in most instances much greater than that between the 25th and the median. There is a tendency for the distance between the 75th and the median to become greater as one goes from

the higher to the lower grades. The lower limits are usually far below those of the standard group

TABLE 14.

TAPPING. INDEX OF FATIGUE—RIGHT HAND.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 12.6 | 2.6 | —9.6 | 10.0 | 12.2 | 40.0 | —63.2 |
| C. 15 | 11.8 | 16.0 | 19.0 | 4.2 | 3.8 | 35.8 | Neg. Index |
| C. 14 | 12.8 | 16.6 | 20.9 | 3.8 | 4.3 | 38.9 | Neg. Index |
| Retarded C. 14 | 13.2 | 17.3 | 21.7 | 4.1 | 4.4 | 34.9 | — 6.3 |
| Retarded C. 15 | * | | | | | | |
| Below-Grade Group 2 | 11.9 | 8.1 | 0.0 | 3.8 | 8.1 | 19.0 | —41.7 |
| Below-Grade Group 1 | 8.0 | — .7 | —16.9 | 8.7 | 16.2 | 40.0 | —59.5 |
| Grade Group 2 | 7.5 | 10.9 | 14.1 | 3.4 | 3.2 | 20.8 | — 8.6 |
| Grade Group 1 | 12.7 | 5.0 | —4.0 | 7.7 | 9.0 | 34.0 | —63.2 |
| Vth Grade | 13.9 | 5.7 | —5.5 | 8.2 | 11.2 | 30.0 | —53.3 |
| VIth Grade | 13.3 | 9.7 | 0.0 | 3.6 | 9.7 | 16.7 | —63.2 |
| VIIth Grade | 12.9 | 5.3 | —11.1 | 7.6 | 16.4 | 34.0 | —40.6 |
| VIIIth Grade | 2.3 | 0.0 | —13.9 | 2.3 | 13.9 | 13.0 | —40.0 |

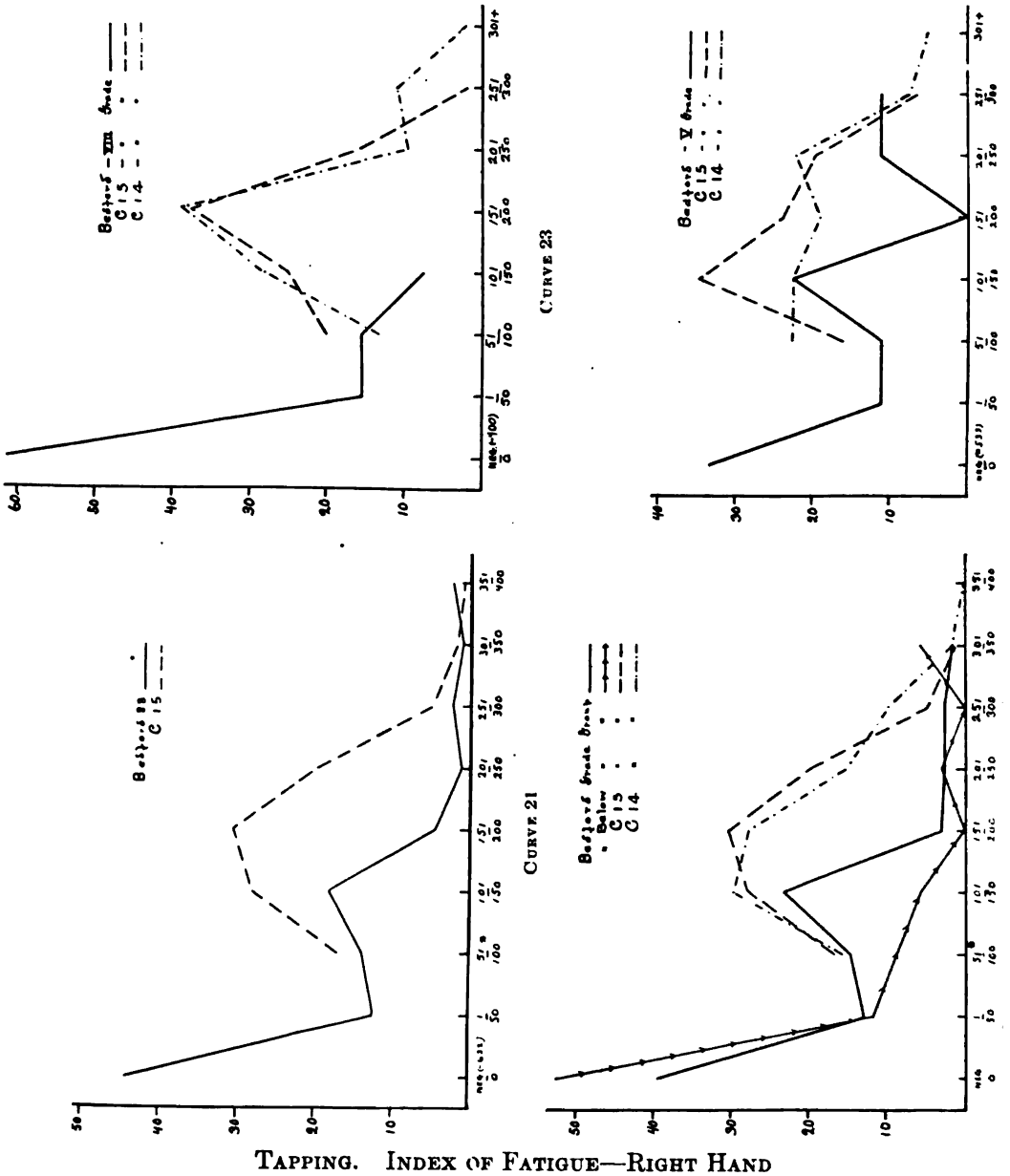
*See footnote, table 10.

TABLE 15.

TAPPING. INDEX OF FATIGUE—LEFT HAND.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 16.5 | 10.3 | 1.5 | 6.2 | 8.8 | 32.2 | —32.5 |
| C. 15 | 13.4 | 17.7 | 21.9 | 4.3 | 4.2 | 40.3 | Neg. Index |
| C. 14 | 12.7 | 17.9 | 21.9 | 5.2 | 4.0 | 44.3 | Neg. Index |
| Retarded C. 14 | 13.8 | 18.4 | 22.2 | 4.6 | 3.8 | 44.3 | — 6.1 |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 15.8 | 8.8 | —4.7 | 7.0 | 13.5 | 31.0 | —32.5 |
| Grade Group | 16.5 | 11.8 | 5.6 | 4.7 | 6.2 | 32.2 | —23.8 |
| Vth Grade | 17.1 | 8.9 | —8.8 | 8.2 | 17.7 | 32.2 | —23.8 |
| VIth Grade | 16.5 | 12.5 | 10.2 | 4.0 | 2.3 | 23.6 | 4.2 |
| VIIth Grade | 17.0 | 14.2 | 1.7 | 2.8 | 12.5 | 25.0 | 4.6 |
| VIIIth Grade | 11.8 | 9.3 | 7.3 | 2.5 | 2.0 | 22.9 | — 2.2 |



CURVE 23

CURVE 21

TAPPING. INDEX OF FATIGUE—RIGHT HAND

100—, Cincinnati scores were not analyzed beyond this point.

SECTION 6. CARD SORTING.

*Standard Method.* "*Materials:* A black box with four compartments, each marked with a circle of color—blue, green, yellow, and red. The colors used were the pure colors of the Hering papers. A pack of 48 cards each one marked with a circle of one of the same colors, twelve of each kind—the pack of cards arranged so that no two cards of the same color followed one another, and so that there were no rhythms of arrangement. A stop-watch.

"*Method of administering the test:* Children who were so short that they could not reach the box comfortably when it was placed on a table, were allowed to stand on a platform of the required height (see steadiness test). The child was placed directly in front of the box, and close to it so that no reaching was involved in the process of sorting.[1]

"The instructions were given as follows: 'You see this black box with the four parts—each one marked with a color. Tell me what color this is, and this one. Yes. Now each of these cards is marked with a circle of one of those colors (showing him several). What I want you to do is to drop each card into the part of the box marked with its own color, and see how fast you can do it. You are right handed, are you not? Then take the pack of cards in your left hand, turned face down, and hold them that way until I tell you to begin. If you should make a mistake and drop a card into the wrong division, don't stop to try to change or correct it, because that would take too much time. Just go right on and see how fast you can get it done. When I say "now," turn the whole pack over, and begin dropping them in just as fast as you can.' The experimenter started the watch after the pack had been turned over, when the child took hold of the first card, and stopped it as he dropped in the last one. The time in seconds, and the number and nature of the errors were recorded."

It was found necessary with our subjects to illustrate a mistake and say "Don't reach in like this and take the card out because it takes too much time, etc."—otherwise this idea is not retained and they continuously *do* try to change their mistakes, the standard directions to the contrary.

In criticism Dr. Woolley indicates that the only doubt to be thrown on this test as a valuable, simple measure of eye-hand co-ordination is the fact that it may be modified by defects of color vision. We tested each subject for color blindness, and so far as could be determined by the Holmgren yarns, none was color blind.

[1] In our work, if the girl was too tall or too short, the sorting box was raised or lowered until for each it was in approximately normal position. The girl stood directly in front of the box and, in accordance with Dr. Woolley's method, close enough to it so that no reaching was necessary in sorting. Often during the test one of our subjects stepped back or to one side and when she did so we did not interfere.

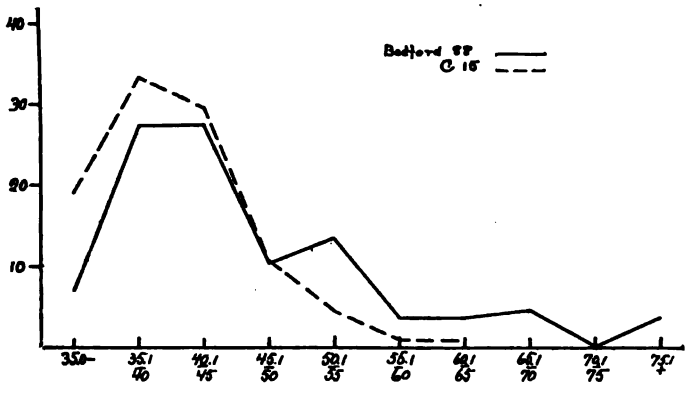
"*Method of dealing with results:* The time was recorded in seconds, and the accuracy in per cents. These two measurements were then combined into an index by dividing the time by the accuracy, giving the estimated time for a perfect performance. Since there were rarely more than two errors, the index does not differ widely from the time. The tables and curves are based upon the index.

"*Criticism:* The index, as an estimated time for a perfect performance, has in it a source of error in this case. The assumption is, of course, that a child who makes errors could have done the sorting without errors by taking more time. But since every child is conscious of his errors and invariably loses time by becoming disturbed over them, the very making of the error increases the time. The index, therefore, seems to place a double penalty on errors. Regarded as an arbitrary way of penalizing records which contain errors, the index has a meaning."

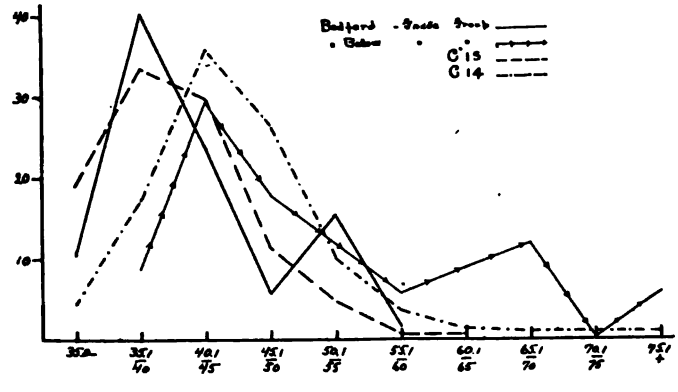
As the individuals tested prove less intelligent they tend to become more clumsy and to make more errors but they are less disturbed and delayed by them. Again, stupidly dropping three cards at a time, or clumsily letting two at a time fall in, demand some form of time penalty. The time penalty for errors becomes, then, more essential as one's subjects become less intelligent. However, even the poorest ones make surprisingly few errors.

*Results:* The records for this test are expressed only in terms of indexes—the estimated time it would have taken to sort the cards without error. If one considers the two factors of time and accuracy separately, it becomes evident in this test, and in those which follow, that there is a closer approximation of the Reformatory type to the standard in accuracy, than in rate of performance. Indeed, there is very little inaccuracy in each group. To be slower, rather than less accurate, than the normal is characteristic of everything they do. It is the most fundamental difference between them and the normal, and it becomes more marked as one goes from the more intelligent (8th-grade group) to the less intelligent (Below-Grade Group) subjects.

The operation of this test is a simple eye-hand co-ordination which is quite like the type of factory work in which our subjects have been, and are likely to be employed. It invites some rapidity and precision of movement and a minimum of discrimination of the material in hand. It does not seem to be a task in which one would expect either school drill or the amount or content of knowledge therein acquired to be of immediate

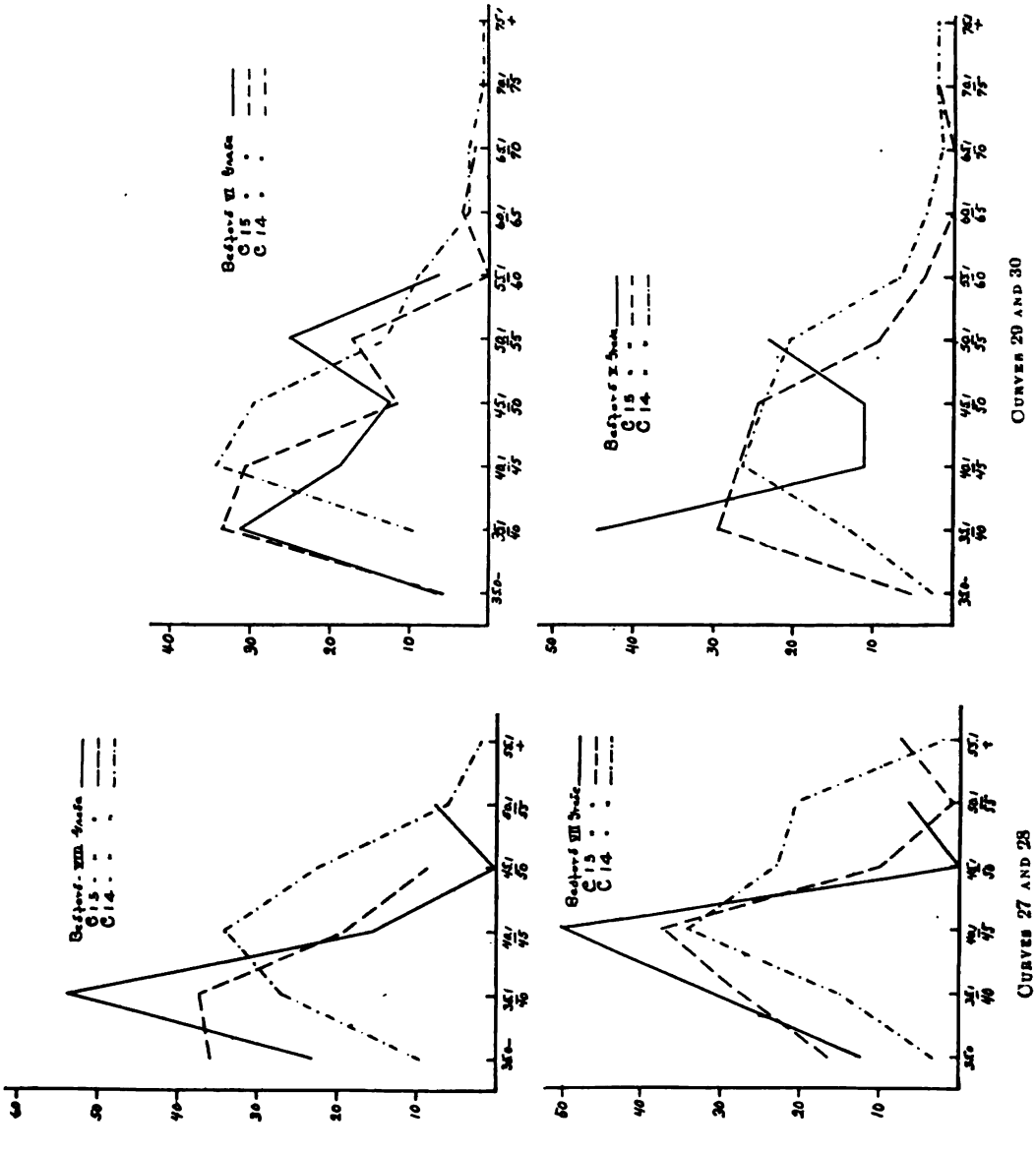



CURVE 25




CURVE 26

CARD SORTING. INDEX



CURVES 27 AND 28

CURVES 29 AND 30

TABLE 16.

INDEX OF CARD SORTING IN SECONDS.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 38.7 | 42.0 | 51.7 | 3.3 | 9.7 | 33.5 | 108.9 |
| C. 15 | 36.8 | 40.8 | 45.2 | 4.0 | 4.4 | 28.5 | 83.3 |
| C. 14 | 41.1 | 45.3 | 49.9 | 4.2 | 4.6 | 31.4 | 83.5 |
| Retarded C. 14 | 42.5 | 46.2 | 51.2 | 3.7 | 5.0 | 33.5 | 83.5 |
| Retarded C. 15 | 38.8 | 42.4 | 47.4 | 3.6 | 5.0 | 31.7 | 83.3 |
| Below-Grade Group | 41.7 | 50.0 | 62.6 | 8.3 | 12.6 | 36.8 | 108.9 |
| Grade Group | 37.6 | 40.1 | 44.6 | 2.5 | 4.5 | 33.5 | 92.1 |
| Vth Grade | 38.8 | 41.8 | 50.8 | 3.0 | 9.0 | 35.3 | 92.1 |
| VIth Grade | 38.8 | 43.3 | 51.8 | 4.5 | 8.5 | 34.0 | 55.8 |
| VIIth Grade | 37.4 | 40.2 | 44.2 | 2.8 | 4.0 | 34.8 | 52.1 |
| VIIIth Grade | 35.5 | 37.8 | 39.6 | 2.3 | 1.8 | 33.5 | 54.7 |
| College Maids | 34.1 | 37.0 | 41.9 | 2.9 | 4.9 | 28.0 | 45.5 |

value as such. The Reformatory women have the advantage of greater physical maturity, strength of grip and steadiness of hand. It would seem as though equal native ability ought to enable them to perform this task more efficiently than the working girl of fifteen who, after a year of industrial experience has out distanced her 14-year-old record. In spite of their physical maturity, they are, however, slower by 1.9, 1.2 and 6.5 sec. than the C 15. at the three percentiles. Their fastest and their slowest records are poorer by 5 sec. and 25.6 sec., respectively. The better quarter of them are quicker than the 14-year-old working girl by 2.4 sec. at the 25th percentile; 50 per cent. are quicker by 3.3 sec. as measured by the median record. The

poorest quarter are slower than the poorest 25 per cent. of the Retarded girls of 14. Even the Grade Group, who have had an equivalent amount of schooling and on the average five years of added experience, are scarcely more skillful in a first trial in such a simple motor performance than the 15-year-old girl. Those who have finished the 8th grade are an exception, but they are only as good as, not better than, the working girl of 15 who has completed the same grade upon leaving school.

The Maids excel the working girl of 15 at all three percentiles; 71.8 per cent. of them excel or equal the median score of C. 15, and only one record is as slow as the 75th percentile record of the standard group.

Curve 26 indicates the inferiority of the Below-Grade Group, who are slower than the Grade Group by 4.1, 9.9, and 18 sec. at the three percentiles. The best quarter of them are only a little better than the poorest quarter of the Grade Group. This Below-Grade Group is slower than C. 15 by 4.9, 9.2, and 17.4 sec. at the three percentiles and poorer than C. Ret. 14 by 3.8 and 11.4 sec. at the median and the 75th percentile. The best quarter of them are 0.8 sec. better.

The positive correlation with grade that exists among the standard groups obtains here too. There is evidently a close correspondence between whatever makes for progress in school and skill in a simple motor process like this. The 5th grade, on the whole superior in strength to the 8th, is disproportionately slower than the same standard grade. They are slower than C. 15 total by 2., 1., and 5.6 sec. at the three percentiles, whereas the 8th grade are quicker by 1.3., 3., and 5.6 sec. The best record among the Bedford group is slower than the best record among C. 15, and the best record of the Bedford 5th grade, as well as of the Below-Grade Group, is much poorer than the poorest standard record. The slowest record of the Bedford 6th, 7th and 8th grades is not as slow by 28 sec. as the slowest record of the C. 15.

The distribution of our records is skewed. The difference between the 75th and the median is almost three times as great for the Bedford 88 as between the 25th and the median records. The upper and lower quartile variation in the C. 15 are each alike within 0.4 sec.

There is a positive correlation of $r = +.58$, P.E. = .05, between the ranks of the index scores of the Bedford 88 and the ranks in native capacity accorded them by the principal of the Reformatory industrial school. Since a number of the individuals who were ranked with respect to their card-sorting indexes had had enough experience in factory work to give them some degree of fore-exercise, as compared with the others, this correction becomes actually a fairly high one.

The clinical value of this test would be increased if the subject were given opportunity to sort the cards three times and the best of the three trials be taken as the measure of skill. Under slightly different test conditions[1] forty of these same cards were sorted by another group of 106 inmates, tested consecutively as they came from the courts. The results show that only 11 of the 106 sorted the cards most rapidly on the first trial. Twenty-eight made their best record on the second, 67 on the third trial. The reason that three trials were not given to the children tested by the Bureau of Vocational Guidance was doubtless lack of time. Wherever possible, however, it is advisable to give the three trials.

### Section 7. Cancellation Test.

*Standard Method.* "*Materials:* A standard printed page of small letters, a stop-watch. (See Whipple's *Manual*, Test 26.) The page contains fifty of each of the letters of the alphabet irregularly distributed through it."

In criticism, Dr. Woolley suggests that a standard page of capitals similarly made up might be better because they are uniform in height. A number cancellation test, other things being equal, would serve clinical purposes such as ours better since numbers are more feasible for use with foreigners. The writer is inclined to believe that the difficulty of the small "a" with the test in its present form has not been without virtue, that it has served to differentiate those without quickness of perception, stable powers of selective attention or what not more clearly than would the less trying page of capitals. The letter "a" was cancelled by the Cincinnati 14-year-old working children; the

[1] Jastrow, Joseph. "A Sorting Apparatus for the Study of Reaction Time," *Psychological Review*, Vol. V., p. 279.

Cincinnati 15-year-old children cancelled the letter "m". The "m" was found to be easier to cancel *per se* than the "a." For this reason it is difficult to estimate just how much the gain of the C. 15 is due to the year of growth and experience. Because of this unequal difficulty between the "a" and the "m" we have compared the Bedford women with the C. 14 only.

"*Method of administering the test:* The page to be marked was laid face down on the table in front of the child. The other page, with a few sample letters already marked, was in the hand of the experimenter, who showed it to the child and instructed him as follows: 'On the other side of this page [pointing to the one turned down on the table] are some letters printed in rows, like this. What I want you to do is to draw a single line with your pencil through every *'a'* on this page, just the way it is done here, and see how fast you can do it. If you should make a mistake, and draw a line through the wrong letter, don't stop to erase it or try to correct it, because that would take too long—just go ahead. Of course I want you to be sure to mark *every 'a'* on the page, and do it just as fast as possible. When I turn the page over, begin, and I will take your time with this watch.' The watch was started after the page was turned over, just as the child began to look for *a's*, and was stopped as he finished the last line. The most important point about the instructions is to see that the factors of speed and accuracy are equally emphasized."

Evidently with the working children it was not found necessary to state specifically that the letters were to be cancelled one row at a time, not in a haphazard fashion. Unless forewarned the duller Reformatory women are more likely than not to skip all about and to cancel the last *a* in the last line as soon as the first *a* of all. To lessen this difficulty we added the specific admonition: "Do the top line first, then the next line, then the next and so on until you do the last line of all." Even then some of the more unstable skipped about. In such instances the end was recorded whenever the subject, having marked one or more *a's* in the last line either stopped or went back to some other line.

"*Method of dealing with results:* The time of the test was recorded in seconds, and the accuracy in per cents. When no wrong letters were crossed, the accuracy was a simple matter of deducting two per cent. for every omission. When wrong letters were crossed, the accuracy was figured according to the formula, expressed concretely for this test,

$$\text{accuracy} = \frac{\text{letters correctly marked}}{50 + \text{letters wrongly marked}}$$

(See Whipple's *Manual*, Page 260.) An index which consisted of time divided by accuracy, representing an estimated time for a perfect performance, was calculated in each case.

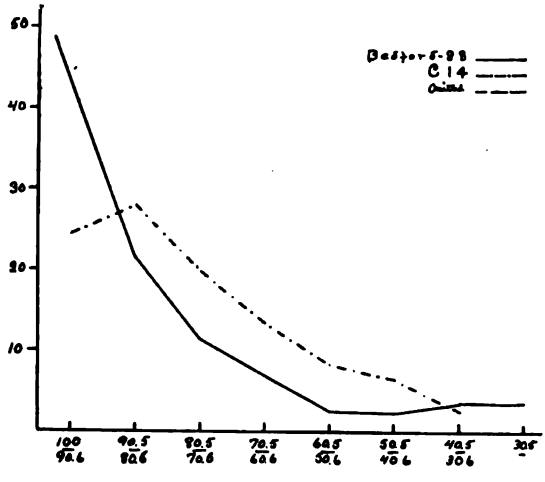
"*Criticism:* The method of estimating accuracy when incorrect letters were crossed did not seem fair for the most frequent type of error. There were very few cases in which a completely wrong letter was crossed. The usual error was to cross the letter next the *a* instead of the *a* itself, an error due to poor motor co-ordination rather than to defective perception, and although we counted correct any *a* that was in any way marked, even though the line went more definitely through another letter, the formula inflicts a double

TABLE 17.

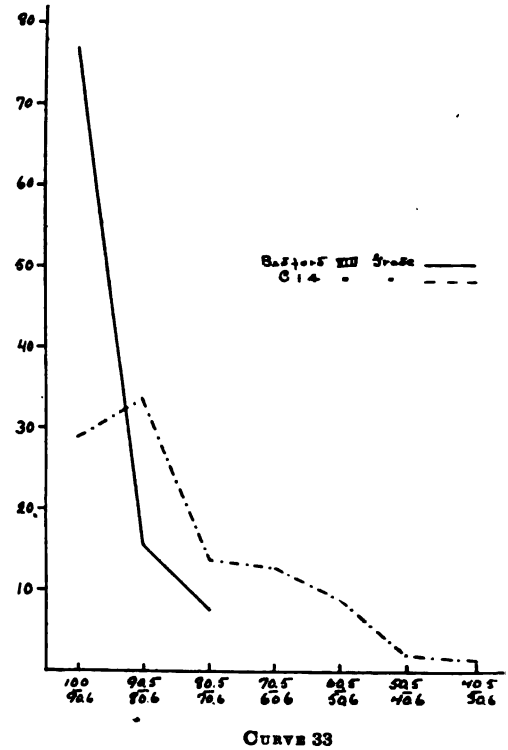
CANCELLATION "A" AND "M" TEST. ACCURACY.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls.

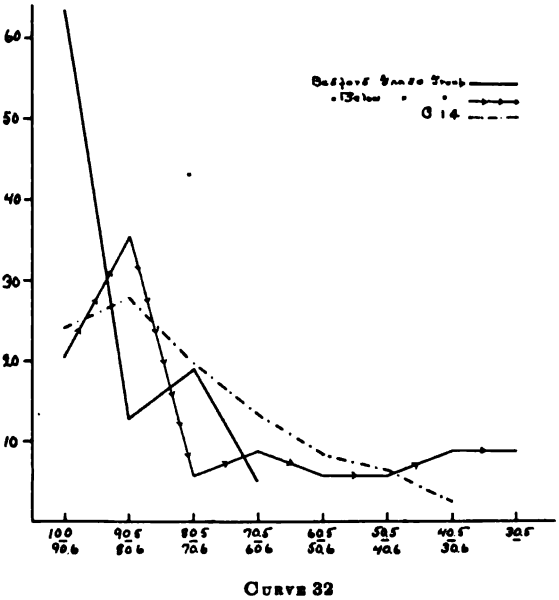
| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 97. | 90. | 78. | 7. | 12. | 100. | 34. (3 Failures) |
| C. 15 | 98.4 | 96.3 | 90.2 | 2.1 | 6.1 | 100. | 52.0 |
| C. 14 | 90.3 | 81.6 | 70.7 | 8.7 | 10.9 | 100. | 30.8 |
| Retarded C. 14 | 90.2 | 80.4 | 66.6 | 9.8 | 13.8 | 100. | 30.8 |
| Retarded C. 15 | 98. | 96. | 90. | 2. | 6. | 100. | 52. |
| Below-Grade Group | 90. | 83. | 50. | 7. | 33. | 98. | 34. (3 Failures) |
| Grade Group | 98. | 94. | 86. | 4. | 8. | 100. | 62. |
| Vth Grade | 92. | 80. | 76. | 12. | 4. | 98. | 72. |
| VIth Grade | 98. | 94. | 89. | 4. | 5. | 100. | 62. |
| VIIth Grade | 98. | 96. | 88. | 2. | 8. | 100. | 68. |
| VIIIth Grade | 98. | 94. | 92. | 4 | 2. | 100. | 74. |
| College Maids | 98. | 95. | 90. | 3. | 5. | 100. | 48. |



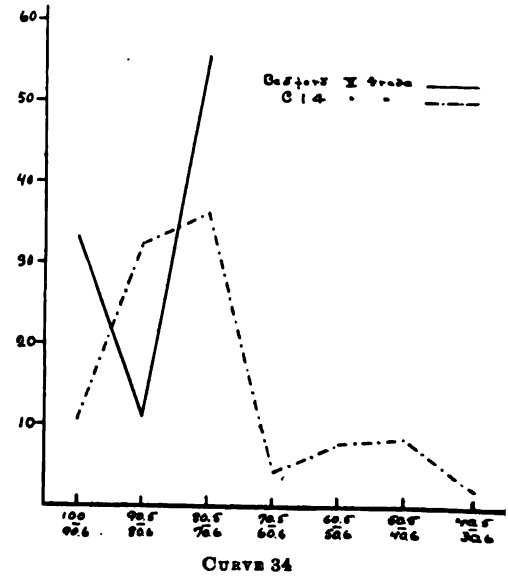
Curve 31



Curve 33



Curve 32



Curve 34

Cancellation Test, Accuracy

penalty for such an error, since it counts off both for *a* omitted, and for the letter wrongly crossed. In papers in which many errors of this type occur, the injustice is glaring, but in most instances there were not more than one or two such errors. Some modification of the formula for this special case ought to be agreed upon."[1]

TABLE 18.

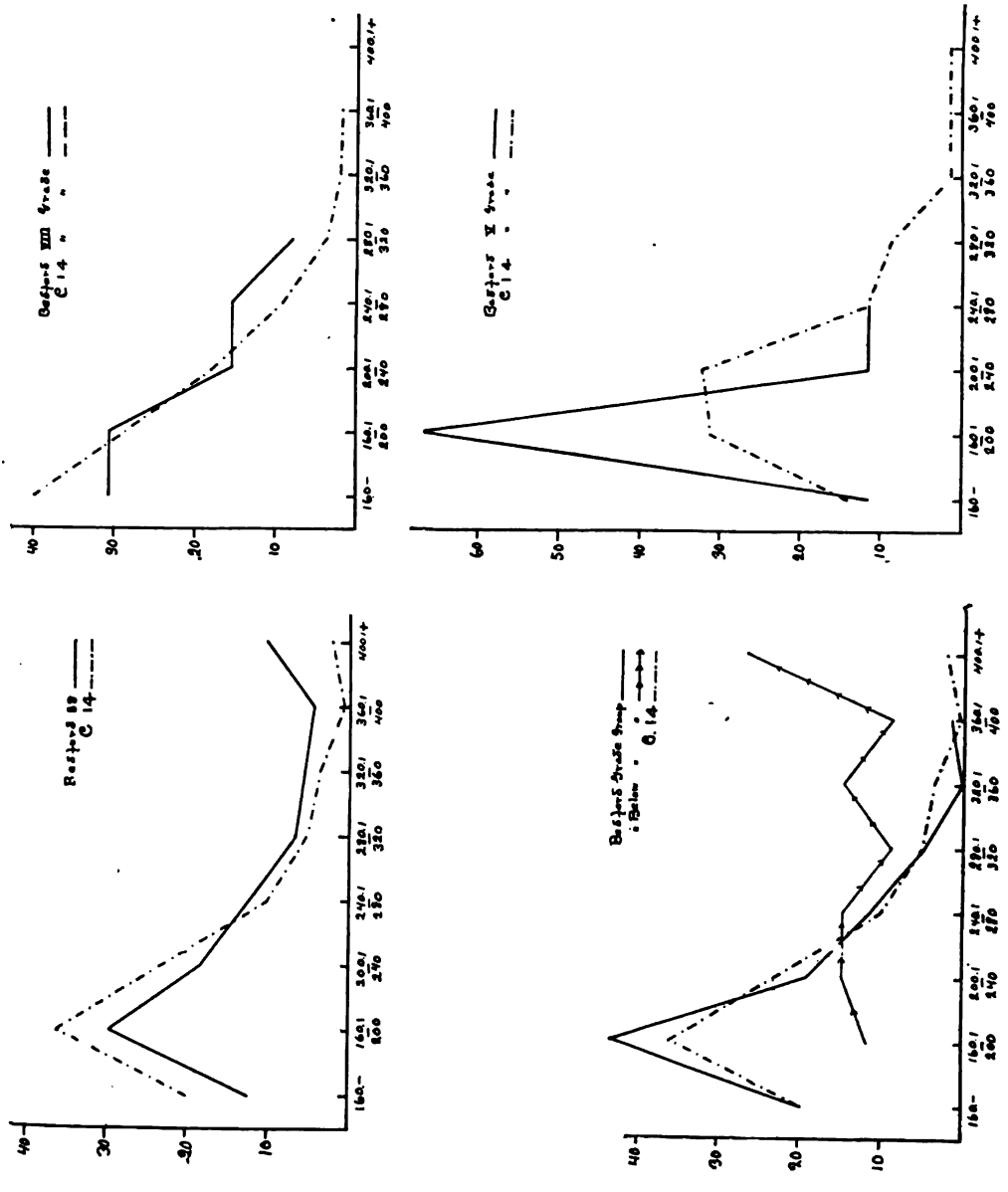
CANCELLATION "A" AND "M" TEST. INDEX.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 172.8 | 222.3 | 297.0 | 49.5 | 74.7 | 102.3 | 610.4 (3 Failures) |
| C. 15 | 129.9 | 150.8 | 177.2 | 20.9 | 26.4 | 84.1 | 402.4 |
| C. 14 | 164.3 | 195.2 | 256.6 | 30.9 | 61.4 | 111.5 | 521.5 |
| Retarded C. 14 | 175.1 | 202.6 | 250.8* | 27.5 | 48.2 | 85.1 | 521.5 |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 235.3 | 312.3 | 458.9 | 77.0 | 146.6 | 163.1 | 610.4 (3 Failures) |
| Grade Group | 163.4 | 194.5 | 233.3 | 31.1 | 38.8 | 102.3 | 361.0 |
| Vth Grade | 168.9 | 189.5 | 199.1 | 20.6 | 9.6 | 102.3 | 247.8 |
| VIth Grade | 177.4 | 220.8 | 253.9 | 43.4 | 33.1 | 127.4 | 361.0 |
| VIIth Grade | 163.0 | 189.0 | 205.1 | 26.0 | 16.1 | 142.0 | 241.8 |
| VIIIth Grade | 154.6 | 195.7 | 228.0 | 41.1 | 32.3 | 120.4 | 301.1 |
| College Maids | 159.4 | 196.5 | 214.0 | 37.1 | 17.5 | 127.0 | 280.0 |

[1] Cases in which the pencil stroke passes through an adjacent letter when the subject plainly meant to cancel an *a* are obviously to be counted as one *a* crossed and no error. Such was the intention of my directions for scoring the test.—*Editor*. On the other hand, if a subject is too careless or too hasty or too clumsy to make her stroke strike out the *a*, it seems to the author that the full penalty should be paid. If a girl inspecting title pages in a book bindery, for instance, should cast out the book following the defective one, it would not only be a mistake but would cost both herself and others a loss of time.

*That the 75th percentile is better for the C. 14. retarded than for the Total C. 14 Group is perhaps due to the fact that we obtained the former by counting out the literal 75th record and Dr. Woolley secured the latter by an estimated count of the cards in the group in which the 75 the record must fall, treating the records as though they were evenly distributed therein.



CURVES 37 AND 38

CURVES 35 AND 36

*Results.* There are percentile tables for both accuracy and index in this test. Clearly it is differences in rate rather than in accuracy of performance that separate most decidedly the more intelligent from the less well trained and intelligent individual.

With respect to the percentiles of accuracy, the Bedford group is at a distinct advantage throughout; except at the 75th percentile even the Below-Grade Group excels. The Reformatory women are 6.7, 8.4, and 7.3 per cent. more accurate than the working girl of 14, as judged by the 25th, the median and the 75th percentiles. The lowest score (complete failures excepted) is 3.2 per cent. higher than the lowest score among the working girls. The Bedford 5th grade is poorer than the 8th, though not markedly so, but both are superior to the working girl of the same grade at 14 years of age (see Curves 33 and 34). All these differences from the standard group are large enough to make accuracy well worth considering in any final score used for clinical purposes.

The indexes of the Bedford 88, prove them to be much slower than the 14-year-old working girl in this simple task of checking letters. It takes them 8.5, 27.1 and 40.4 sec. longer at the 25th, median, and 75th percentiles than it takes the C. 14.

The Grade Group and the Below-Grade Group are unmistakably differentiated by the time consumed in performing this test (see Curve 32). Over 75 per cent. of the Grade Group is superior to the Below-Grade Group. Moreover, the best record of the Below-Grade Group is 60.8 sec. slower than the best record of the Grade Group, and its poorest record is 249.4 sec. slower than the poorest record of the Grade Group. The lowest scores for the Grade and Below-Grade and the C. 14 groups are respectively 361, 610 (three failures), and 521.5 sec. Despite the fact that their scores have already been included in the C. 14 group as a whole, the Ret. C. 14 are 10.8 and 7.4 sec. slower at the 25th and median points, respectively. Obviously, there is a correspondence in this test between its rate of performance and the differences in intelligence as indicated by school grade.

The correlation between the rank in ability to check off all the *a*'s—an operation not unlike a large variety of inspection

jobs in factories, and the rank accorded these women in their native intelligence as based upon inspection of their behavior for over a year within the institution is $r. = +.52$, P.E. .055.

The College Maids were given this test. They excelled in both time and accuracy the 14-year-old working girl at the 25th and at the 75th percentile but only 44 per cent. equalled the best 50 per cent. of the standard group. On the other hand, the best 50 per cent. of the Reformatory 8th grade excel the Maids at the median and the 25th percentiles. In capacity to cancel letters with skill and expedition a small per cent. of the Reformatory women are as able as the more efficient type of maid in a college dormitory.

### Supplementary Cancellation Test.

Records in the cancellation of No. 1 in the number checking test of Woodworth and Wells[2] were secured for the first 43 of these 88 Reformatory subjects. These records we have divided into two groups, according as the subjects fell into the division of the Grade or Below-Grade Group. Table 19 tabulates for each of these grades the average time, the slowest and the quickest records, the average number of errors due to omissions and due to the cancellation of wrong digits, together with the corresponding data given by Woodworth and Wells for twenty college women.

Though few, these records point to a tendency for the longer time scores to correlate with the lower school attainment. (See Table 20).

Woodworth and Wells write: "On the basis of false reactions the test has not shown in the writers' hands workable individual differences in the 'accuracy' of performance. There are perfectly distinct differences in the time of performance and there seems little reason in the present test for extending the score beyond this single factor" (p. 28). It is clear that in dealing with groups such as ours and probably with the 14 and 15-year-old working girl, too, accuracy as well as time furnish significant group differences.

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[2] R. S. Woodworth and F. L. Wells: Association Tests, *Psychological Monograph*, Vol. XIII., No. 5. 1911.

Among our rate of learning tests there is included one which consists of checking all the six-place numbers containing the two specific digits 4 and 7.[3] Here, too, differences in accuracy are less evident than those in rapidity of work. Again, too, the dullest subjects succeed finally in attaining the standard rate of performance.

TABLE 19.

NUMBER CANCELLATION

Average time, Mean Variation and Limits for Cancellation of Number *1* by College Women and Reformatory Subjects.

| Subjects | 20 College Women | 27 Grade Group | 16 Below-Grade |
|---|---|---|---|
| Average Time | 123 sec. | 136.5 sec. | 192 sec. |
| M. V. | 15 sec. (Approximately) | 20.6 sec. | 45 sec. |
| Limits | | High 187<br>Low 100 | High 423.6<br>Low 112.6* |
| Errors { Omissions | Negligible | 1.11 | 6.2 |
| Errors { Wrong letters | Very rare | 0.44 | 0.2 |

*Only three scores are lower than 149 sec.

TABLE 20.

Average time, Mean Variation and Limits in Cancellation of Number *1* for Reformatory Grade Groups.

| | VIII Grade | VII Grade | VI Grade | V Grade | Below-Grade |
|---|---|---|---|---|---|
| No. of Cases | 4 | 6 | 11 | 6 | 16 |
| Average time | 120.9″ | 121.1″ | 140.3″ | 155.5″ | 192″ |
| M. V. | 19.7″ | 13.1″ | 17.8″ | 20.4″ | 45″ |
| Limits | 160.2″<br>101.2″ | 142.6″<br>100″ | 177.8″<br>114″ | 187″<br>120″ | 423.6″<br>112.6* |

*Only three scores are lower than 149 sec

[3] Woodworth and Wells, *Op. cit.* p. 52.

SECTION 8. MEMORY SPAN AND PER CENT. OF SEVEN, EIGHT AND NINE NUMBERS RECALLED. (See Whipple's *Manual*, Test 38A.)

*Standard Method.* "*Materials:* Seven strips of card-board, one with five digits, two with seven, two with eight, and two with nine digits, printed on them in large black type. A metronome.

"*Method of administering the test:* The strips of card-board, in the order indicated, were laid face downward upon the table. The child was supplied with pencil and paper, the metronome conveniently placed, and instructions given as follows: 'On the other side of these cards are some numbers, printed in a row. I am going to turn the card face up and then I want you to read the numbers out loud with me. When we have finished reading them, I will turn the card down again, and I want you to see if you can write the numbers on your paper just the way they were on the card—just the same numbers, and in the same order. I will set this instrument ticking (does so at one a second) just to show how fast to read the numbers. Read one every time it ticks, like this (illustrates). The first card is just a sample to see if you understand how to do it, but write the numbers down just the same. There are five numbers on it.' The sample card of five is then read, and any errors in procedure on the child's part corrected. The sample card may be used more than once if necessary, since its result is never taken into account. When the test has been correctly performed with the sample, the experimenter proceeds with the other cards, stating each time how many numbers there will be on each card, as—'There will be seven numbers on this card,' etc.

"There are two precautions to be observed in the use of the metronome in this test. The first is to time the turning of the cards with the beat of the metronome in such a way that the reading of the first number naturally and unmistakably coincides with a beat. Otherwise the child and the experimenter may begin reading on different beats, and thus disturb the test. The second precaution is for the experimenter to postpone stopping the metronome until the last series has been written by the child. If the metronome is stopped just after the reading, and before the child has written, the sudden cessation of the sound serves as a distraction, and the conditions for the writing of the last series are not uniform with those of the other series.

"*Method of dealing with results:* The evaluation of the results of this test is by no means a simple matter, unless one takes into account only the perfect series—in other words, measures only the memory span. None of the rules so far devised for estimating results is satisfactory. The most serious failing, common to them all, is that they make no allowance for crediting a correct sequence of three or more digits in the wrong part of the series. The set of rules we adopted for this series of tests is as follows:

1. For a correct digit in correct place in the series, allow two, giving a value of 14 to a perfect seven-place series, 16 for an eight-place series and 18 for a nine-place series.

2. For any series in which there is but *one* mistake, whether it is an omission, an addition, or a misplacement, take off two only. For instance, if the correct series is 7359624 and the child writes 7396254, count it only one error, since the series can be made perfect by changing the position of one digit—the 5.

3. In series in which there is more than one error—

a. allow two for every correct digit in the correct position, and one for every correct digit one place removed (except in special case under b).

b. allow no credit for a correct digit more than one place removed, unless it forms part of a correct sequence of three or more digits. In every such sequence, allow full credit for all except the first digit, which should be given no credit if it is more than one place removed, and half credit if it is one place removed. For instance, if the correct series is the one already quoted—7359624, and the child writes 7962453, the series should be marked as follows:

2 0 2 2 2 0 0
7 9 6 2 4 5 3

giving a value of 8.

There is a positive correlation of $r = + .58$, P.E. = .05, between the ranks of the index scores of the Bedford 88 and the ranks in native capacity accorded them by the principal of the Reformatory industrial school. Since a number of the individuals who were ranked with respect to their card-sorting indexes had had enough experience in factory work to give them some degree of fore-exercise, as compared with the others, this correction becomes actually a fairly high one.

The clinical value of this test would be increased if the subject were given opportunity to sort the cards three times and the best of the three trials be taken as the measure of skill. Under slightly different test conditions[3] forty of these same cards were sorted by another group of 106 inmates, tested consecutively as they came from the courts. The results show that only 11 of the 106 sorted the cards most rapidly on the first trial. Twenty-eight made their best record on the second, 67 on the third trial. The reason that three trials were not given to the children tested by the Bureau of Vocational Guidance was doubtless lack of time. Wherever possible, however, it is advisable to give the three trials.

### Section 7. Cancellation Test.

*Standard Method.* "*Materials:* A standard printed page of small letters, a stop-watch. (See Whipple's *Manual*, Test 26.) The page contains fifty of each of the letters of the alphabet irregularly distributed through it."

In criticism, Dr. Woolley suggests that a standard page of capitals similarly made up might be better because they are uniform in height. A number cancellation test, other things being equal, would serve clinical purposes such as ours better since numbers are more feasible for use with foreigners. The writer is inclined to believe that the difficulty of the small "a" with the test in its present form has not been without virtue, that it has served to differentiate those without quickness of perception, stable powers of selective attention or what not more clearly than would the less trying page of capitals. The letter "a" was cancelled by the Cincinnati 14-year-old working children; the

[3] Jastrow, Joseph. "A Sorting Apparatus for the Study of Reaction Time," *Psychological Review*, Vol. V., p. 279.

The number series used were

5 2 4 1
3 5 7 2
8 4 6 2 7
4 3 6 8 5
6 8 3 1 5 2
9 3 5 2 7 4
9 4 1 2 8 3 7
2 4 7 5 1 3 8
3 1 4 6 2 5 9 7
4 7 2 9 3 8 5 1
8 9 7 2 1 4 6 3 5
4 7 5 2 9 6 3 8 1
9 7 3 1 4 2 5 8 6 0
8 6 9 7 1 3 2 4 0 5

TABLE 21.

MEMORY SPAN

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls, and for College Maids.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 8. | 7. | 5. | 1. | 2. | 9. | 4 minus |
| C. 15 | 9.0 | 8.1 | 7.3 | 0.9 | 0.8 | 9. | 7 minus |
| C. 14 | 9. | 7.9 | 7.1 | 1.1 | 0.8 | 9. | 7 minus |
| Retarded C. 14 | 8. | 7. | 7— | 1. | ? | 9. | 7 minus |
| Retarded C. 15 | 8. | 7. | 7. | 1. | 0. | 9. | 7 minus |
| Below-Grade Group | 7. | 5. | 4. | 2. | 1. | 9. | 4 minus |
| Grade Group | 9. | 8. | 7. | 1. | 1. | 9. | 5 |
| Vth Grade | 7. | 7. | 6. | 0. | 1. | 9. | 5 |
| VIth Grade | 8. | 8. | 7. | 0. | 1. | 9. | 5 |
| VIIth Grade | 9. | 8. | 7. | 1. | 1. | 9. | 6 |
| VIIIth Grade | 9. | 8. | 7. | 1. | 1. | 9. | 5 |
| College Maids | 9. | 9. | 8. | 0. | 1. | 9. | 6 |

*Results:* (*1.*) *Memory Span.* The 88 Reformatory women have on the whole a poorer memory span, as indicated at all three percentiles, than has even the working girl of fourteen. Over 38 per cent. of them are as poor as, or poorer than, the poorest 13 per cent. of the working girls of fifteen years.

That this decreased retentiveness correlates with degree of intelligence as indicated by the school grade attained is made evident by Curve 40. The percentiles of the Grade Group coincide almost exactly with those of the C. 15. The curve of the Below-Grade Group is exactly contrasted to that of the Grade Group. The two groups are thus unmistakably differentiated with respect to memory span. The 25th percentile of the less intelligent group is as low as the 75th percentile of the Grade Group; no individual among the latter recalls less than five numbers, while 29 per cent. of the former recall not

TABLE 22.

MEMORY FOR 7-PLACE NUMBERS.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 75th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 100. | 85.7 | 60.7 | 14.3 | 25.0 | 100. | 7.2 (1 Failure) |
| C. 15 | 98.2 | 95.8 | 88.4 | 2.4 | 7.4 | 100. | 57.0 |
| C. 14 | 96.7 | 91.7 | 80.4 | 5.0 | 11.3 | 100. | 35.0 |
| Retarded C. 14 | 92.9 | 85.7 | 75.0 | 7.2 | 10.7 | 100. | 35.7 |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 75.0 | 59.0 | 39.8 | 16.0 | 19.2 | 100. | 7.2 (1 Failure) |
| Grade Group | 100. | 92.9 | 78.6 | 7.1 | 14.3 | 100. | 46.5 |
| Vth Grade | 85.7 | 78.6 | 75.0 | 7.1 | 3.6 | 100. | 46.5 |
| VIth Grade | 100. | 92.9 | 78.6 | 7.1 | 14.3 | 100. | 50.0 |
| VIIth Grade | 100. | 100. | 91.1 | 0. | 8.9 | 100. | 46.5 |
| VIIIth Grade | 100. | 100. | 85.7 | 0. | 14.3 | 100. | 60.7 |

more than four, and their median record is no better than the poorest record of all among the Grade Group. Two of the VIII Grade, 2 of the VII Grade, 1 of the VI Grade and 3 of the Below-Grade Group have a memory span for ten numbers. Seventy-seven per cent. of the Maids have a span equal to or greater than that of the median working girl of fifteen, *i. e.*, eight digits, and 60 per cent. can recall nine digits—the 25th percentile standard score.

The memory span of the 8th and 7th grades is identical and each remembers a series of digits longer by two digits at the 25th percentile and by one digit at the median and the 75th percentile, respectively, than does the 5th grade at the same points.

The decided group differences and grade correlations which maintained in the standard group are even more manifest among our subjects. As the working girl exhibited a larger amount of positive correlation in this test than in any other,

TABLE 23.

MEMORY FOR 8-PLACE NUMBERS.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 87.5 | 65.7 | 45.4 | 21.8 | 20.3 | 100. | 6.3 (2 Failures) |
| C. 15 | 93.9 | 83.5 | 70.6 | 10.4 | 12.9 | 100. | 22. |
| C. 14 | 92.0 | 78.6 | 64.5 | 13.4 | 14.1 | 100. | 25. |
| Retarded C. 14 | 87.5 | 75.0 | 56.3 | 12.5 | 18.7 | 100. | 25. |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 62.5 | 43.8 | 31.3 | 18.7 | 12.5 | 100. | 6.3 (2 Failures) |
| Grade Group | 87.5 | 76.6 | 62.5 | 10.9 | 14.1 | 100. | 28.2 |
| Vth Grade | 59.4 | 59.4 | 40.7 | 0.0 | 18.7 | 71.9 | 28.2 |
| VIth Grade | 87.5 | 82.9 | 65.7 | 4.6 | 17.2 | 100. | 56.3 |
| VIIth Grade | 92.3 | 84.4 | 67.2 | 7.9 | 17.2 | 100. | 46.9 |
| VIIIth Grade | 100.0 | 81.3 | 65.7 | 18.7 | 15.6 | 100. | 34.4 |

not only at the time she left school, but after a year of working record, so our subjects, after being out of school five years on the average, show the same positive correlation. This further datum helps to answer Dr. Woolley's query as to whether the high positive correlation with grade was merely a sad commentary on the mechanical training of the school or an indication that the test and the school alike are highly successful in distinguishing the more intelligent from the less intelligent individual.

The correlation between rank in these memory tests and the rank in native intelligence of the Bedford 88 as based upon observation of them for over a year within the Institution is:

| | | |
|---|---|---|
| Memory Span | $r = +.66$ | $P.E. = .043$ |
| Memory for 7 Numbers | $r = +.65$ | $P.E. = .046$ |
| " " 8 " | $r = +.62$ | $P.E. = .048$ |
| " " 9 " | $r = +.60$ | $P.E. = .050$ |

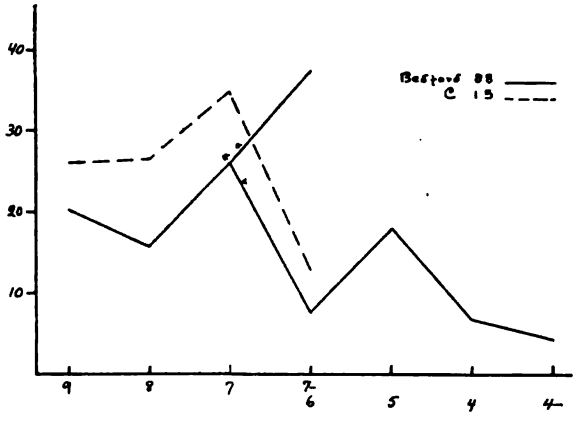
*(2.) The Per Cent. of Seven, Eight and Nine Numbers Recalled.*

TABLE 24.

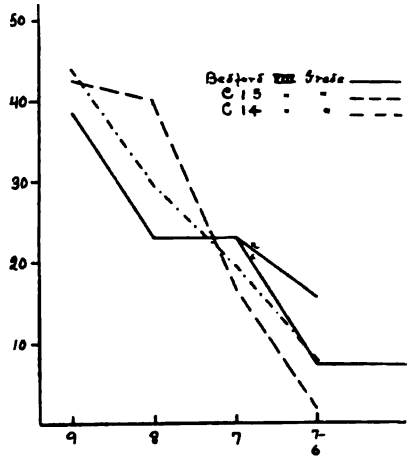
MEMORY FOR 9-PLACE NUMBERS.

Percentile, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade, Groups and for the S andard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls.

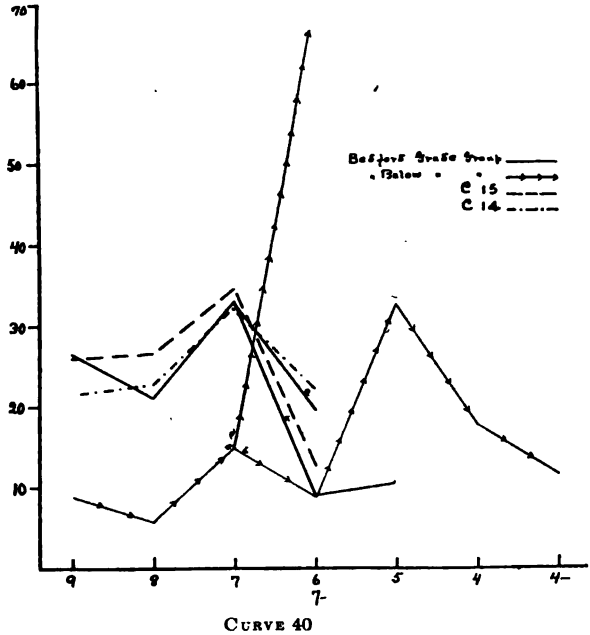
| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 77.8 | 61.2 | 40.3 | 16.6 | 20.9 | 100. | 13.9 (2 Failures) |
| C. 15 | 84.7 | 71.5 | 58.7 | 13.2 | 12.8 | 100. | 22.0 |
| C. 14 | 82.2 | 68.2 | 55.9 | 14.0 | 12.3 | 100. | 22.0 |
| Retarded C. 14 | 75.0 | 61.1 | 58.4 | 13.9 | 2.7 | 100. | 27.8 |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 52.8 | 34.8 | 22.2 | 18.0 | 12.6 | 94.5 | 13.9 (2 Failures) |
| Grade Group | 83.4 | 72.2 | 58.4 | 11.2 | 13.8 | 100. | 8.4 |
| Vth Grade | 63.9 | 55.6 | 50.0 | 8.3 | 5.6 | 83.4 | 8.4 |
| VIth Grade | 83.4 | 70.9 | 59.8 | 12.5 | 11.1 | 100. | 38.9 |
| VIIth Grade | 86.1 | 76.4 | 63.9 | 9.7 | 12.5 | 100. | 50.0 |
| VIIIth Grade | 91.7 | 75.0 | 69.5 | 16.7 | 5.5 | 100. | 44.5 |



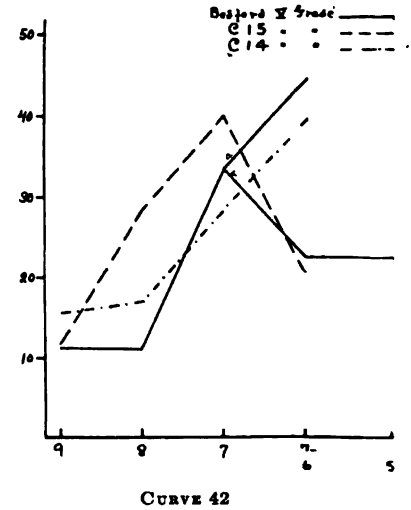
CURVE 39



CURVE 41



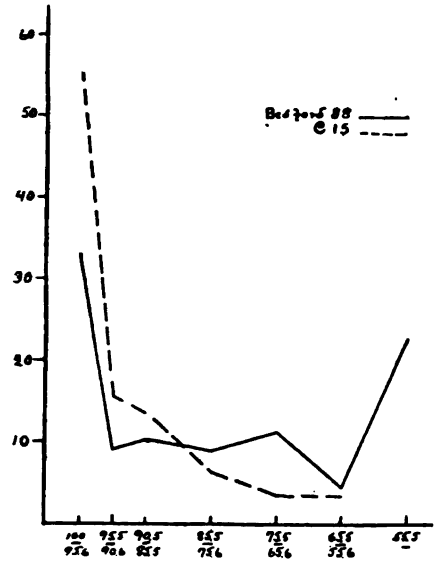
CURVE 40



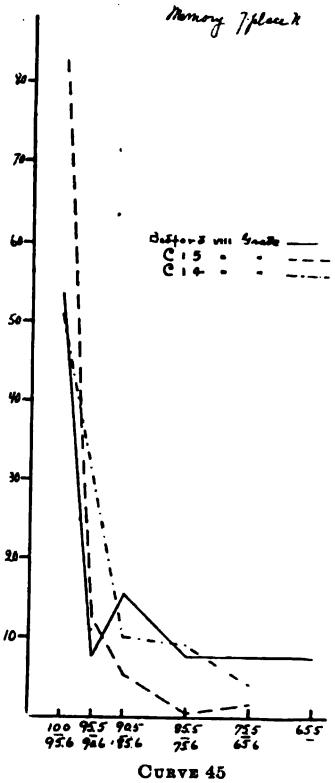
CURVE 42

## MEMORY SPAN

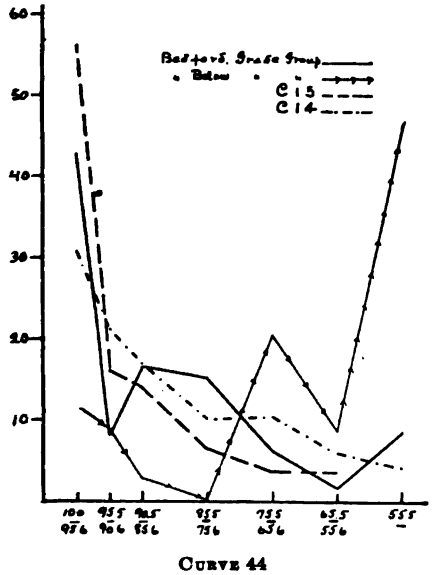
* In this and the following curves for memory span line "a" indicates the total per cent. that remember less than seven numbers, and compares exactly with the standard distribution method; the line "b" indicates the per cent. of those who remember less than seven numbers whose span is actually 6–5–4 and less than four numbers.



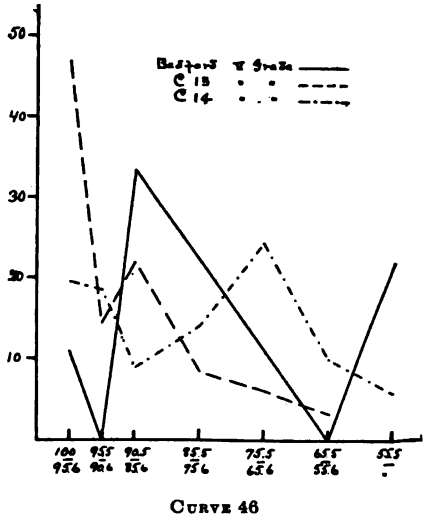

CURVE 43




CURVE 45




CURVE 44




CURVE 46

MEMORY. SEVEN-PLACE NUMBERS

*A. Seven Numbers.* The per cent. of seven numbers which the Bedford group recall is less than that of the working girl of either 15 or 14 years except at the 25th percentile. It is equal at the median to the retarded group at 14 years of age but poorer at the 75th percentile. Approximately three-quarters of the working girls at 15 can remember more than the poorer half of the Reformatory group.

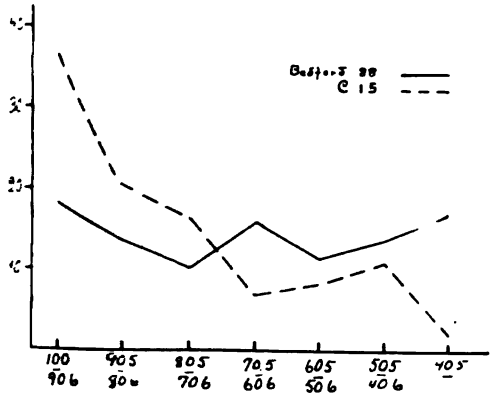
The Below-Grade Group recall 3.6 per cent. less at the 25th percentile than does the Grade Group at the 75th percentile. This means but slight overlapping of the two groups. The Vth and VIth Grades recall decidedly less than the VIIth and VIIIth at the median and 75th percentiles. The poorest record of the Grade Group is lower than that of the C. 15, but higher than that of the C. 14, and C. Ret. 14, and the Bedford Below-Grade Group (see Curve 44).

*B. Eight and Nine Numbers.* In memory both for eight and nine numbers the Bedford 88 are inferior to the C. 15. They are also inferior to the C. Ret. 14.

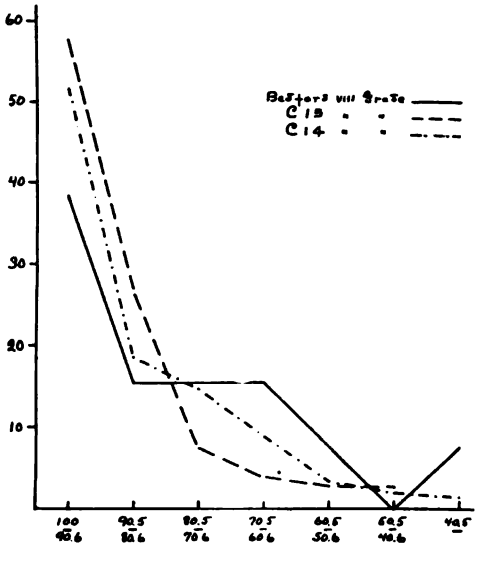
The Grade Group is essentially as successful as the C. 15 in its recall of nine numbers; of eight numbers on the other hand it recalls no more than does the C. Ret. 14 at the 25th percentile, and at the median and 75th percentile a little more than they but still slightly less than the C. 14.

Of the Below-Grade Group three-quarters are as poor as, or poorer than, the poorest quarter of the Grade Group in memory for both eight and nine numbers. Within the Grade Group each lower grade recalls less of nine numbers at each percentile down to the Vth Grade, which is poorer by 5.6 per cent. at the 25th percentile than is the VIII Grade at the 75th percentile.

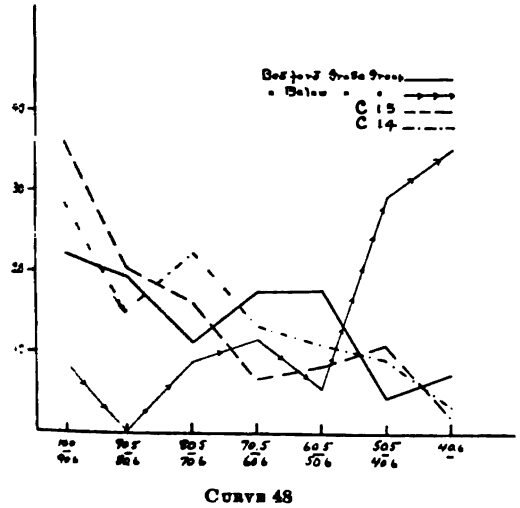
As contrasted with the standard groups, the Reformatory women recall less, proportionately, of eight than of nine digits with a tendency among the Below-Grade Group to be equally poor in both. (See Curves 47 and 51. The actual numerical differences at the three percentiles are given in Table 25.) This capacity to come nearer to the working girl's ability to recall nine digits than to her ability to recall eight can hardly be accounted for in terms of an increasing adaptability to the requirements of the test. It has rather to do, in our opinion,



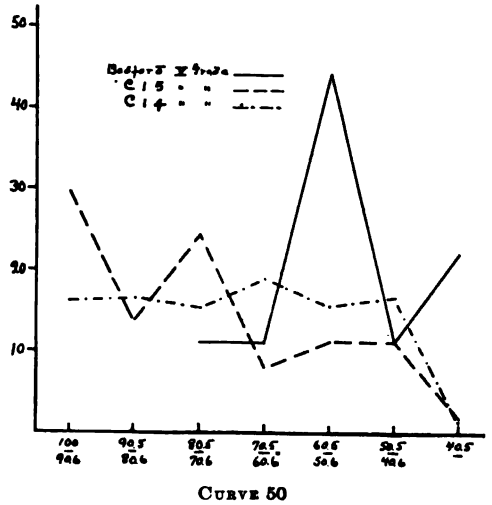

CURVE 47




CURVE 49

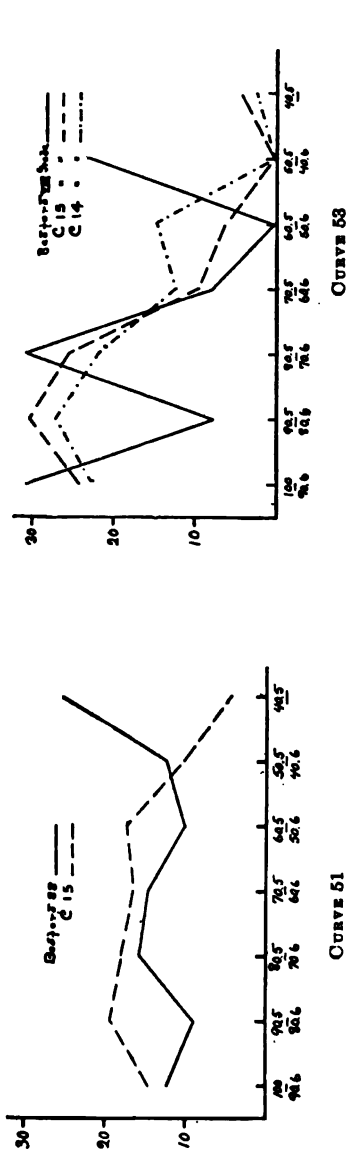



CURVE 48




CURVE 50

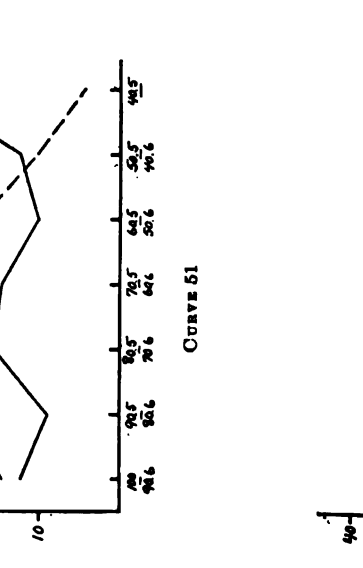
MEMORY. EIGHT-PLACE NUMBERS



CURVE 51



CURVE 53



CURVE 52



CURVE 54

MEMORY. NINE-PLACE NUMBERS

with the types of imagery involved. Nine digits fall easily into three groups of three digits each, which have simpler and more emphatic auditory-verbal rhythmic value than any grouping possible with eight numbers. An individual who has a good visual memory, which he uses for all the number series or upon which he can fall back when the auditory or verbal series become unrhythmical, will be at an advantage over the individual who must depend almost wholly on the auditory-verbal imagery. The indications are that the Reformatory women do lack facility in the use of visual imagery.

TABLE 25.

Differences Between the Per Cent. of Eight and Nine Digits Recalled by the Reformatory Subjects as Compared with the Per Cent. Recalled by C. 15.

| Groups | Tests | 25th Per. | Median | 75th Per. |
|---|---|---|---|---|
| Bedford 88 | 8 Digits | 6.5 | 17.8 | 25.2 |
| | 9 Digits | 7.0 | 10.3 | 18.4 |
| Grade Group | 8 Digits | 6.4 | 6.9 | 8.1 |
| | 9 Digits | 1.3 | .3 | —.3 |
| Below-Grade Group | 8 Digits | 31.4 | 39.3 | 39.3 |
| | 9 Digits | 31.9 | 36.3 | 36.5 |

SECTION 9. SUBSTITUTION.[1]

*Standard Method.* "*Materials:* Four blank pages of geometrical figures of nine different kinds, fifty figures on a page (see Fig. 1). A card bearing the nine figures in a row, with the digits from 1 to 9 printed in the figures in order (see Fig. 2).

"*Method of administering the test:* The experimenter laid the first page of figures before the child on the table, set the card up where it could be easily seen, and gave instructions as follows: 'You see this page of figures. Now on this card I have the same figures, but each figure has a number on it. What I want you to do is to write in each figure on this page, the number that you see in the same figure on that card. For instance, what figure would you put in here? (Experimenter points to one of the figures which might easily be confused with another one—the triangle or the U. If the child makes the wrong answer, the experimenter points out the error), and in here? (the experimenter takes one of the unique figures). I want you to begin here at the top of the page, and fill the figures in in rows, just as you come to them. As you finish each row, I will cover it up with this piece of card-board, this way. Now begin, and see how fast you can get the whole page done.'

"The stop-watch was started as soon as the child began to look on the card for his first number, and stopped as he finished writing the last one. After the time for the first page was recorded, the child was given the second page, with the instruction: 'Now fill in this page the same way, and see if you can do it faster this time.'

"At the beginning of the third page, the experimenter said, 'Now fill in this page, and try to do it still faster. When you finish this page, I will take the card away, and then I want you to try to fill in the last page just from memory.' If the child noticed errors before the line was covered, he was allowed to correct

[1]This particular form of substitution test was devised by Dr. Woolley. There were several keys. We used only the one here reproduced.

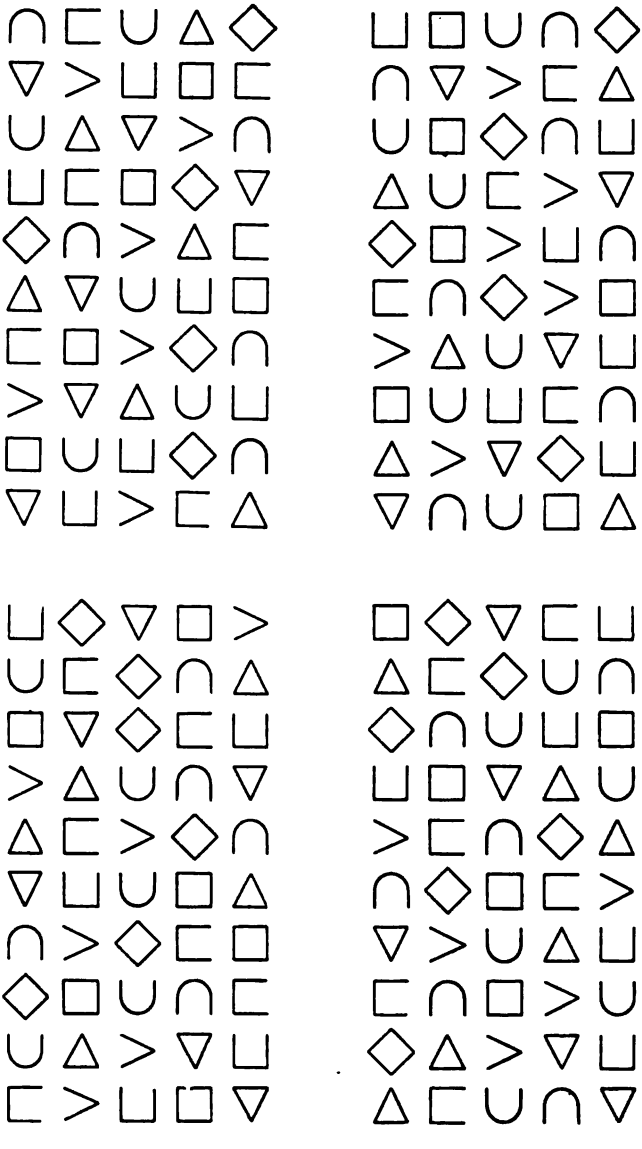


FIGURE 1

them. The object of covering each line as soon as the child had filled it in, was to make sure that in the first three pages he worked constantly from the key, and on the fourth page constantly from memory—never from his own previous records. Some children who made no errors in the first few lines of page four, became uncertain and made errors toward the bottom of the page. Others who were uncertain at first, seemed to gain confidence as they went on, and were more correct in the latter part of the page than in the beginning."

FIG. II. Key

The apparent ability of the Reformatory subjects to make the substitutions varied, we found in a series of preliminary tests, with the distance which the key-sheet was placed from the line containing the figures in which the substitutions were to be made. In the case of the poorer six or eight per cent., if the key was more than three inches from the top of the page, they were unable to make the substitutions at all in the last half of the substitution page, though they proceeded with fair success in the first half. Their memory is so largely immediate and so little retentive that in the presence of a series so complex as nine different numbers and nine different figures it was too difficult for them to remember from the bottom of the page which figure they must find the correct number for in the key, and then keep the association between the number and the figure long enough to get back to the bottom of the page. In order not to counteract the real issue of the test, *viz.*, *can* an individual *learn* to associate certain numbers with certain figures in the course of one or more pages, we fixed the distance of the key from each line of the substitution sheet at about four inches. This was accomplished by fastening the key to the middle of the cover pasteboard, which, by the standard method, was pushed down to cover each succeeding line as it was filled in by the subject.

"*Method of dealing with results:* The time and the accuracy were recorded for each page separately. Since there were just fifty figures on a page, each error or each omission meant two per cent. off from one hundred. The two measures were then combined into an index, which was, again, time divided by accuracy, or the estimated time of perfection."

The assumption implied in the index that if a longer time had been taken for each, the several substitutions would have been perfect, is sometimes not safe for our lower-grade subjects, some of whom are unable to make the substitution under any

condition. Dr. Woolley herself indicates that the index of the memory page must not be taken to mean that more time spent in filling in this page would have resulted in a perfect record. It does serve, however, as she points out, as a fair measure of the combined part played by the two factors of time and accuracy in the memory page.

This fourth page was found to have an additional value in certain supplementary tests where it proved to be fairly indicative *of the number of learning pages* necessary to effect a perfect learning. In these supplementary experiments we continued to alternate a learning page with a memory page for all those who did not succeed in getting on the fourth page an original score of 98 to 100 per cent. In the case of those whose first page was so poor as to be practically a failure it seemed incredible that they would ever learn the associations; it seemed a ridiculous performance to continue the test with them, but we did so, and most of them formed the substitutions when given enough practice.

The index of the first page of practice, also, proved to be prophetic of the number of practice pages required to recall not less than 94 per cent. of the associations. When the indexes of this page were very low, it took twenty learning pages to effect perfect learning; with indexes a little less, fifteen pages were sufficient; finally, we found that those with the best indexes had learned the substitution perfectly after only one and a half learning pages, although it took them a little longer to fill in the memory page than it would have had they had all three practice pages of the standard series.

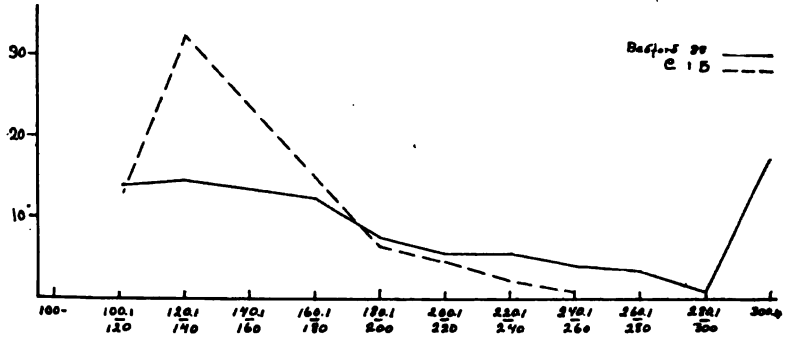
It appears then that the index is of clinical value as a fairly reliable measure of individual differences in capacity to learn. In institutions such as Bedford it is often an advantage to be able to predict whether the time it will take to teach a given individual a simple performance is one-half or ten times or twenty times as long as the time required to teach a normal person.

"To assign a value to the performance of any individual in this test, all four pages must be taken into consideration. We must know not only how well he did on the fourth page, but how much time he had put into the learning process of the first three pages. In fact, the most significant fact about the test seems to be the rate of the first three pages. In other words, two individuals may have arrived at the same degree of perfection on the fourth page, but one of them may have taken twice the time of the other to arrive there."

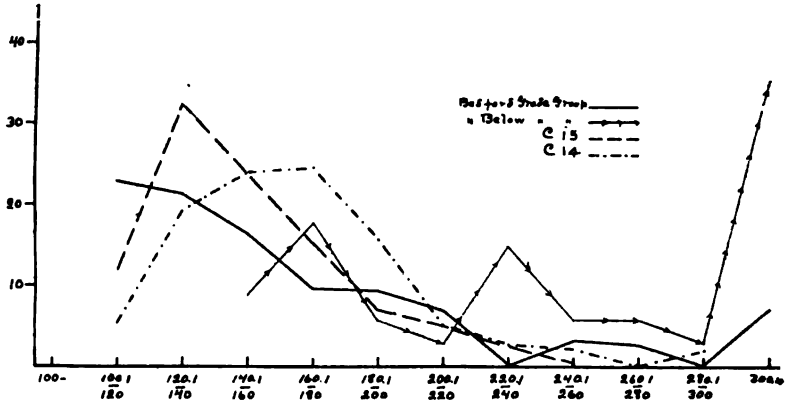
Something which at first sight approximates the reverse of this is true of the duller ones of such a group as ours. Once they understand what is required on pages one, two and three, they make the substitutions with approximate rapidity, but fail signally to learn the associations in the process and recall such as they have formed with extreme slowness. At all events, their scores are disproportionately below the normal on the fourth page. After one passes beyond the group that can *learn* readily in one, two or three pages of practice, it becomes not so much a *matter of the time it takes an individual to fill in the substitutions on any given practice page, but of how many times it is necessary for her to repeat a page of the substitutions before they are finally learned.* James's time-worn phrase "lowered permeability of the nervous system" nicely describes their condition, a condition which can be compensated for only by repetition after repetition of the stimulus.

*Results:* There are percentile tables for both accuracy and index in this test. There are curves for the indexes only. Table 34 tabulates the numerical results obtained by subtracting the three percentiles of accuracy and index of the College Maids, the Bedford 88, the Grade and the Below-Grade Group from those of the C. 14, C. 15 and C. Ret. 14.

Inspection of these tables and curves shows three things. (1) It is in rate of accomplishment more than in accuracy of accomplishment that the various Reformatory groups differ most from each other and the different grade groups from one another. The working girls, too, vary from one another proportionally less in accuracy than in rate of performance. (2) Both the College Maids and the Reformatory subjects differ from the standard group much more widely on pages one and four than on pages two or three. Page one measures the rapidity and skill with which the adjustment is made to a new situation. Here, in this ability to comprehend what is expected and to act quickly, the advantage is entirely with the working girl. Even the Maids are slower than the C. 15, by 6.8 sec., 8.1 sec., and 19.0 sec., respectively, at the three percentiles; the Bedford 88 are 6.5 sec., 24.5 sec. and 73.4 sec., slower than the same standard group at the same percentiles. Pages two and three tend to measure simply the absolute ability of an individual to make the substitutions *per se.* Here the 75th percentile of the Maids

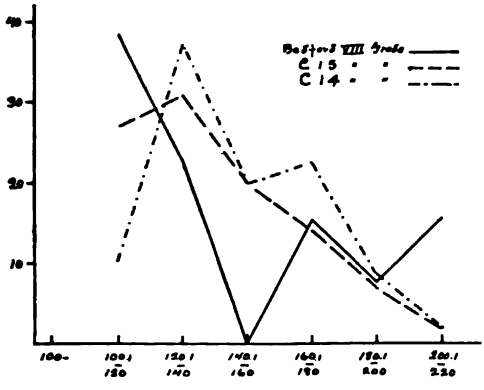



CURVE 55

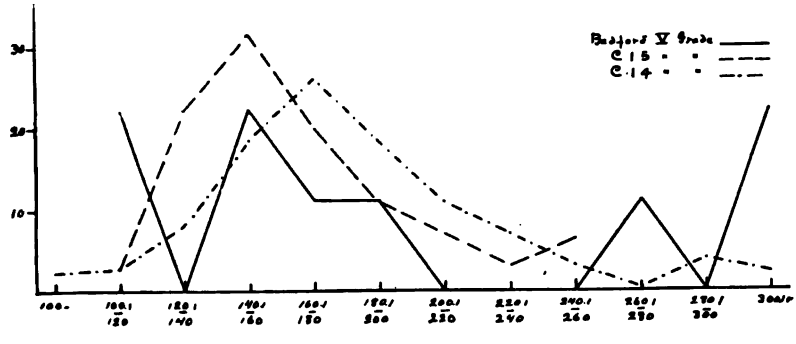



CURVE 56

INDEX OF SUBSTITUTION. PAGE 1

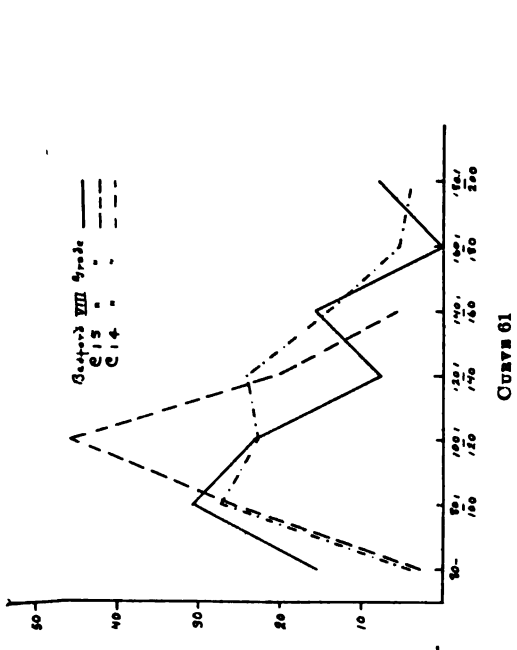



CURVE 57

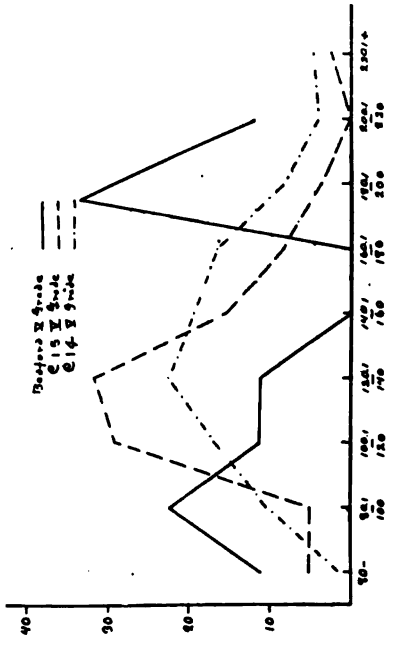



CURVE 58

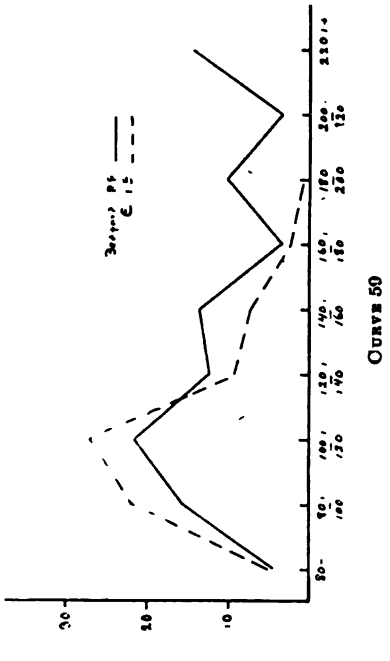
INDEX OF SUBSTITUTION. PAGE 1



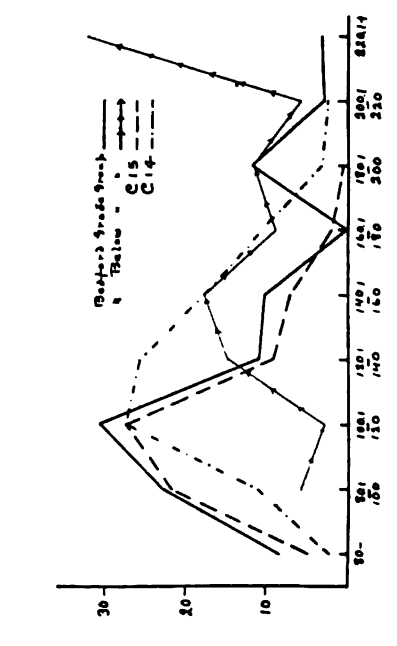
CURVE 61



CURVE 62

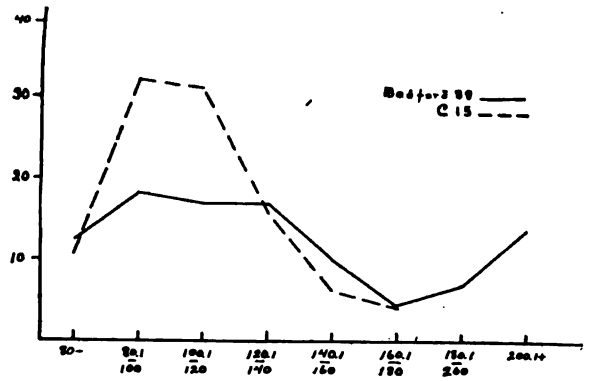


CURVE 50

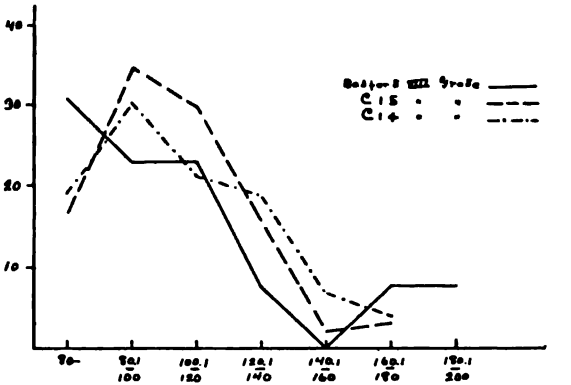


CURVE 60

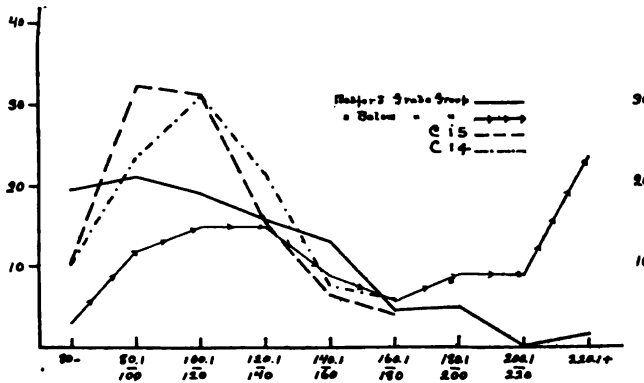
INDEX OF SUBSTITUTION. PAGE 2



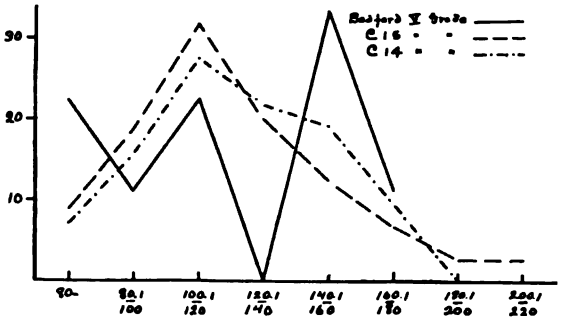

CURVE 63




CURVE 65

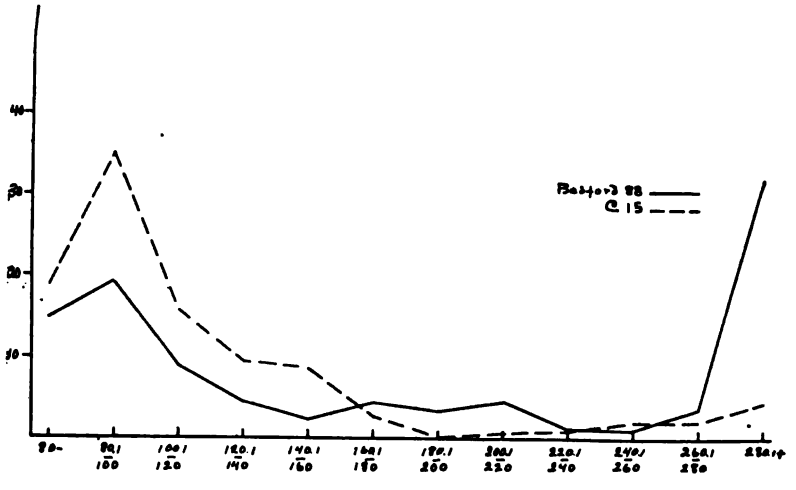



CURVE 64

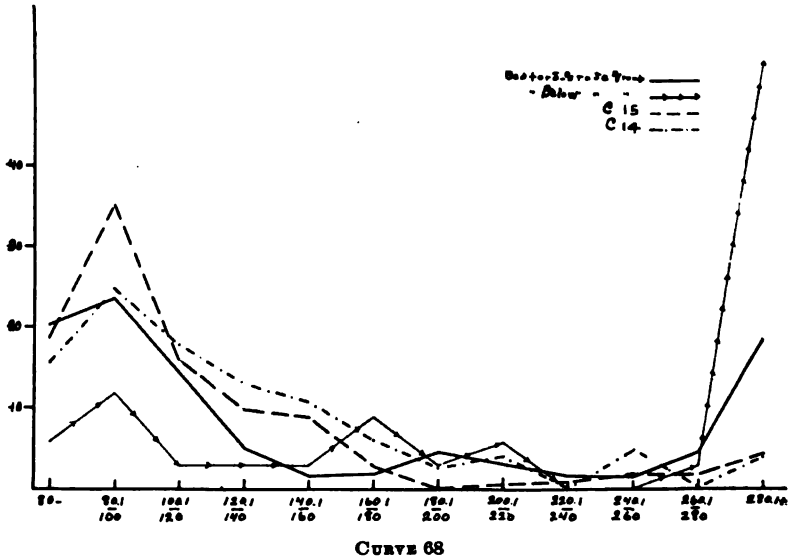



CURVE 66

INDEX OF SUBSTITUTION. PAGE 3

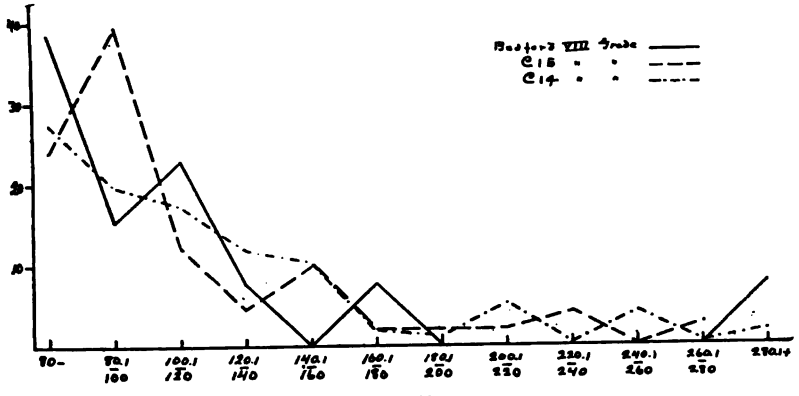



CURVE 67

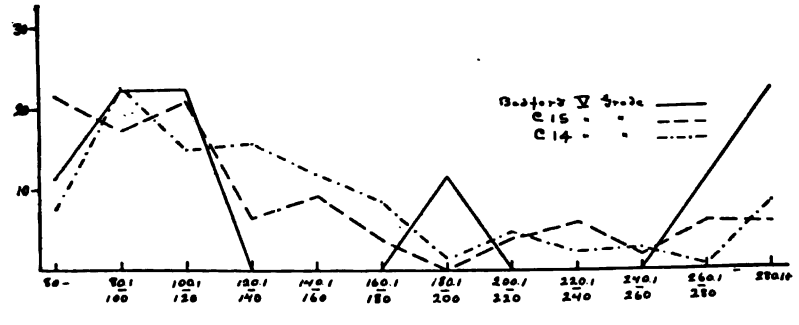



CURVE 68

INDEX OF SUBSTITUTION. PAGE 4



CURVE 69



CURVE 70

INDEX OF SUBSTITUTION. PAGE 4

excel the C. 15 on page two by 10.1 sec., versus a deficit of 19 sec. on page 1; they are still slower at the Median but only by 2.3 sec. as versus 8.1 sec. on the first page. In the case of the Bedford 88, the per cents. on page two differ from those of the standard by 50 per cent. less than they differed on page one. The absolute amounts are 3.9 sec., 11.2 sec. and 45.2 sec. Apparently, thus, both the Maids and the Reformatory women have greater ability to make the substitutions than facility to appreciate what is expected of them and to proceed on the first page with readiness and dispatch. Page four measures capacity to learn in terms of the actual amount that can be recalled and the rapidity with which it can be recalled. Here, again, the differences are greater between the standard and the Maids and the Reformatory groups

TABLE 26.

SUBSTITUTION PAGE 1. ACCURACY IN PER CENTS.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls, and for College Maids.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit | |
|---|---|---|---|---|---|---|---|---|
| Bedford 88 | 100. | 98. | 91. | 2. | 7. | 100. | 52. | (2 Failures) |
| C. 15 | 99.0 | 98.8 | 96.2 | 0.2 | 2.6 | 100. | 64. | |
| C. 14 | 97.4 | 94.6 | 90.2 | 2.8 | 4.4 | 100. | 70. | |
| Retarded C. 14 | 98. | 94. | 90. | 4. | 4. | 100. | 70. | |
| Retarded C. 15 | 100. | 98. | 98. | 2. | 0. | 100. | 64. | |
| Below-Grade Group | 99. | 94. | 82. | 4. | 12. | 100. | 54. | (2 Failures) |
| Grade Group | 100. | 99. | 94. | 1. | 5. | 100. | 52. | |
| Vth Grade | 100. | 94. | 88. | 6. | 6. | 100. | 52. | |
| VIth Grade | 100. | 99. | 95. | 1. | 4. | 100. | 90. | |
| VIIth Grade | 100. | 100. | 97. | 0. | 3. | 100. | 82. | |
| VIIIth Grade | 100. | 100. | 98. | 0. | 2. | 100. | 78. | |
| College Maids | 100. | 98. | 96. | 2. | 2. | 100. | 86. | |

than on pages two or three, to the disadvantage of the two latter The working girls recall a higher per cent. in distinctly less time. (3) Pages one and four serve to divide the Reformatory women into two clearly differentiated groups corresponding with and confirming the school's estimate of intelligence, *i. e.*, the Grade Group and the Below-Grade Group. On page four 55 per cent. of the index scores and 56 per cent. of the accuracy scores of the latter are as poor as the poorest quarter of the former. Also the best quarter of the Below-Grade Group is equalled or surpassed in accuracy by 61 per cent. and in index by 65 per cent. of the Grade Group. Thus, the Grade Group are superior to the Below-Grade Group in both the amount they have learned and the rapidity with which they recall it.

TABLE 27.

SUBSTITUTION PAGE 2. ACCURACY IN PER CENTS.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups, and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls, and for College Maids.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit | |
|---|---|---|---|---|---|---|---|---|
| Bedford 88 | 100. | 98. | 96. | 2. | 2. | 100. | 50. | (2 Failures) |
| C. 15 | 99.1 | 98.3 | 96.6 | 0.8 | 1.7 | 100. | 82. | |
| C. 14 | 98.8 | 97.3 | 94.3 | 1.5 | 3. | 100. | 66. | |
| Retarded C. 14 | 100. | 98. | 94. | 2. | 4. | 100. | 74. | |
| Retarded C. 15 | 100. | 100. | 98. | 0. | 2. | 100. | 82. | |
| Below-Grade Group | 98. | 96. | 90. | 2. | 6. | 100. | 50. | (2 Failures) |
| Grade Group | 100. | 100. | 98. | 0. | 2. | 100. | 66. | |
| Vth Grade | 100. | 98. | 94. | 2. | 4. | 100. | 78. | |
| VIth Grade | 100. | 100. | 97. | 0. | 3. | 100. | 94. | |
| VIIth Grade | 100. | 100. | 98. | 0. | 2. | 100. | 66. | |
| VIIIth Grade | 100. | 100. | 98. | 0. | 2. | 100. | 76. | |
| College Maids | 100. | 98. | 96. | 2. | 2. | 100. | 92. | |

There is a positive grade correlation that is as close as that for the standard group. The VIII Grade is clearly the best in capacity to learn, as measured by the index of the memory page and by the shortened time spent in learning as measured by the lower indexes of pages one, two and three. When capacity to learn is rated by ability to remember (page four), the 8th-grade Reformatory women are better than the C. 15 in both accuracy and time, but at all other points the Reformatory women are less accurate than the standard and become increasingly so as the grade at which they finally left school becomes lower. The Grade Group with its equivalent amount of schooling is 3.7 sec., 7.9 sec. and 81.7 sec. slower than the fifteen-year-old girl. At the 25th and 50th percentile points they are 0.8 sec.

TABLE 28.

SUBSTITUTION PAGE 3. ACCURACY IN PER CENTS.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups, and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls, and for College Maids.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 100. | 98. | 96. | 2. | 2. | 100. | 44. (2 Failures) |
| C. 15 | 99.2 | 98.4 | 96.8 | 0.8 | 1.6 | 100. | 82. |
| C. 14 | 99.1 | 98.1 | 96.1 | 1. | 2. | 100. | 78. |
| Retarded C. 14 | 100. | 98. | 96. | 2. | 2. | 100. | 78. |
| Retarded C. 15 | 100. | 100. | 98. | 0. | 2. | 100. | 88. |
| Below-Grade Group | 100. | 98. | 92. | 2. | 6. | 100. | 44. (2 Failures) |
| Grade Group | 100. | 100. | 98. | 0. | 2. | 100. | 92. |
| Vth Grade | 100. | 98. | 98. | 2. | 0. | 100. | 94. |
| VIth Grade | 100. | 100. | 95. | 0. | 5. | 100. | 92. |
| VIIth Grade | 100. | 100. | 100. | 0. | 0. | 100. | 92. |
| VIIIth Grade | 100. | 98. | 98. | 2. | 0. | 100. | 94. |
| College Maids | 100. | 99. | 96. | 1. | 3. | 100. | 94. |

quicker than the fourteen-year-old girl at the same record points; at the median they surpass the retarded working girl of fourteen by 7.5 sec. but when these retarded girls are retested at fifteen (after a year of working history), they surpass the Grade Group of the Reformatory women at all percentiles. Of our Below-Grade Group three-quarters are as slow as, or slower than, the record that marks off the poorest quarter, not only of the C. 15 and C. 14, but also of the retarded girl when tested at fourteen. The College Maids, too, are poorer than the retarded fourteen-year-old girls, except at the 25th percentile. It may be that universally, as under the conditions of this test, the Maids learn

TABLE 29.

SUBSTITUTION PAGE 4. ACCURACY IN PER CENTS.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups, and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls, and for College Maids.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit | |
|---|---|---|---|---|---|---|---|---|
| Bedford 88 | 100. | 84. | 64. | 16. | 20. | 100. | 14. | (2 Failures) |
| C. 15 | 98.8* | 97.2 | 89.1 | 1.6 | 8.1 | 100. | 8. | |
| C. 14 | 98.6* | 95.9 | 84.7 | 2.7 | 11.2 | 100. | 24. | (1 Failure) |
| Retarded C. 14 | 100.† | 96. | 84. | 4. | 12. | 100. | 24. | (1 Failure) |
| Retarded C. 15 | 100. | 98. | 88. | 2. | 10. | 100. | 8. | |
| Below-Grade Group | 86. | 69. | 50. | 17. | 19. | 100. | 22. | (2 Failures) |
| Grade Group | 100. | 90. | 76. | 10. | 14. | 100. | 14. | |
| Vth Grade | 100. | 88. | 76. | 12. | 12. | 100. | 18. | |
| VIth Grade | 100. | 94. | 70. | 6. | 24. | 100. | 36. | |
| VIIth Grade | 100. | 90. | 63. | 10. | 27. | 100. | 14. | |
| VIIIth Grade | 100. | 98. | 84. | 2. | 14. | 100. | 64. | |
| College Maids | 98. | 86. | 72. | 14. | 14. | 100. | 54. | |

*Estimated as though individuals were evenly distributed from 98 to 100 per cent. No such record actually possible.

†Actual 25th percentile records from count of cards.

more slowly than the retarded working children, yet it seems more likely that this form of learning test is disproportionately difficult for older women than for the girl of fourteen or fifteen, that if the association to be learned were between colors and the places where they belonged, or between numbers and different garments to be packed, the older women who had mentality to go as far in school as the working girl, would hold their own much better than here where the number and the figure have little meaning and depend largely upon rote recall. To obtain an adequate measure of the capacity of women to learn, one or more tests wherein the material is of concrete practical significance ought to be added to the series of the Bureau of Vocational Guidance. We have carried through two such tests but they are to be published separately.

TABLE 30.

SUBSTITUTION PAGE 1. INDEX.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls, and for College Maids.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 136.9 | 173.1 | 245.0 | 36.2 | 71.9 | 104. | 958.3 (2 Failures) |
| C. 15 | 130.4 | 148.6 | 171.6 | 18.2 | 23.0 | 98.4 | 307.8 |
| C. 14 | 142.0 | 162.6 | 185.6 | 20.6 | 23.0 | 83.3 | 419.5 |
| Retarded C. 14 | 151.6 | 172.0 | 195.3 | 20.4 | 23.3 | 83.3 | 419.5 |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 179.7 | 243.4 | 324.4 | 63.7 | 81.0 | 153.3 | 958.3 (2 Failures) |
| Grade Group | 122.5 | 143.0 | 191.0 | 20.5 | 48.0 | 104.0 | 492.7 |
| Vth Grade | 145.2 | 171.9 | 265.9 | 26.7 | 94.0 | 104.0 | 492.7 |
| VIth Grade | 139.4 | 154.2 | 181.0 | 14.8 | 26.8 | 110.9 | 314.6 |
| VIIth Grade | 119.3 | 134.0 | 169.2 | 14.7 | 35.2 | 107.4 | 253.2 |
| VIIIth Grade | 115.6 | 131.4 | 174.0 | 15.8 | 42.6 | 106.2 | 209.0 |
| College Maids | 137.2 | 156.7 | 190.6 | 19.5 | 33.9 | 113.3 | 428.6 |

There is a positive correlation between the rank of the index scores of the fourth page and rank in native ability to profit by the training of the industrial school of the institution. This correlation is $r = + .48$, P.E. = .057.

We append here the results of the substitution test described by Woodworth & Wells,[2] which was given to a group of girls selected at random from each of the following Reformatory groups: (1) the Honor Cottage, to which are sent those whom the institution selects as most capable of self-control and self-direction. These girls make their own house rules, have a house Council, and are given all the freedom in self-government

TABLE 31.

SUBSTITUTION PAGE 2. INDEX.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups, and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls, and for College Maids.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 107.5 | 130.2 | 183.3 | 227.0 | 531.0 | 64.4 | 812.0 (2 Failures) |
| C. 15 | 103.6 | 119.0 | 138.1 | 15.4 | 19.1 | 67.4 | 295.1 |
| C. 14 | 108.7 | 130.4 | 154.0 | 21.7 | 23.6 | 68.0 | 298.4 |
| Retarded C. 14 | 114.6 | 139.3 | 163.0 | 24.7 | 23.7 | 68.0 | 298.4 |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 140.8 | 177.1 | 232.3 | 36.3 | 55.2 | 89.2 | 812.0 (2 Failures) |
| Grade Group | 94.2 | 114.1 | 144.5 | 19.9 | 30.4 | 64.4 | 238.5 |
| Vth Grade | 94.2 | 123.4 | 191.0 | 29.2 | 67.6 | 64.4 | 215.4 |
| VIth Grade | 106.8 | 117.0 | 131.1 | 10.2 | 14.1 | 80.8 | 198.4 |
| VIIth Grade | 96.0 | 112.8 | 136.6 | 16.8 | 23.8 | 73.6 | 238.5 |
| VIIIth Grade | 85.0 | 112.2 | 131.0 | 27.2 | 18.8 | 76.9 | 180.3 |
| College Maids | 103.1 | 121.3 | 128.0 | 18.2 | 6.7 | 81.6 | 312.8 |

[2]R. S. Woodworth and F. C. Wells. Association Tests. *Psychological Monograph* XIII, No. 5, 1911, pp. 53–55.

that they have the power to sustain—a system in theory that is not unlike self-government in certain of our women's colleges, (2) Lowell Cottage, which is a household made up of those whom the institution recognizes as subnormal mentally, (3) the Nursery, which is the cottage for women who have with them children who are younger than two years.

The figures that follow in Table 35 show that the *best* score of these Reformatory women is only a little better than the *poorest* score of the university student. Furthermore, there are characteristic differences between the average time-scores of the several cottage groups into which the individuals have been classified by the institution. The Honor-Cottage group is distinctly superior to the others. In this as in other tests, the girls

TABLE 32.

SUBSTITUTION PAGE 3. INDEX.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups, and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls, and for College Maids.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 93.1 | 121.9 | 160.6 | 28.8 | 38.7 | 65.2 | 756.8 (2 Failures) |
| C. 15 | 91.9 | 108.7 | 128.7 | 16.8 | 20.0 | 59.2 | 248.6 |
| C. 14 | 94.0 | 112.7 | 134.8 | 18.7 | 22.1 | 59.8 | 242.9 |
| Retarded C. 14 | 97.7 | 118.5 | 147.0 | 20.8 | 28.5 | 59.8 | 242.9 |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 117.2 | 157.9 | 215.0 | 40.7 | 57.1 | 75.6 | 756.8 (2 Failures) |
| Grade Group | 91.0 | 106.1 | 136.1 | 15.1 | 30.0 | 65.2 | 222.0 |
| Vth Grade | 91.2 | 116.1 | 158.3 | 24.9 | 42.2 | 75.0 | 168.5 |
| VIth Grade | 92.7 | 121.5 | 134.3 | 28.8 | 12.8 | 76.6 | 190.6 |
| VIIth Grade | 88.6 | 105.5 | 133.8 | 16.9 | 28.3 | 65.2 | 222.0 |
| VIIIth Grade | 75.7 | 97.8 | 120.0 | 22.1 | 22.2 | 69.2 | 186.3 |
| College Maids | 86.2 | 99.3 | 136.5 | 13.1 | 37.2 | 71.4 | 229.4 |

who come to the institution with illegitimate babies are, with few exceptions, among the duller inmates of the Reformatory. (The large average deviation of Lowell is due to the scores of two or three very low-grade feeble-minded girls who were much below the general average.)

In its present form this test is less useful as a learning test than Dr. Woolley's substitution test. Its five substitutions are too easily learned and differences among the brighter individuals are either lost or negligible. Only a few who tested under eight years by the Binet tests failed to learn the associations by the time the bottom of the page was reached. The longer series of associations of Dr. Woolley's test and its specific memory page offer advantages that admit of the isolation and measurement of a greater range of individual differences.

TABLE 33.

SUBSTITUTION PAGE 4. INDEX.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups, and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls, and for College Maids.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 96.6 | 157.5 | 335.0 | 60.9 | 177.5 | 57.8 | 1130.8 (2 Failures) |
| C. 15 | 85.3 | 103.9 | 139.3 | 18.6 | 35.4 | 50.6 | 19875.0 |
| C. 14 | 88.5 | 112.6 | 150.5 | 24.1 | 37.9 | 52.0 | 525.4 (1 Failure) |
| Retarded C. 14 | 91.0 | 119.3 | 162.1 | 28.3 | 42.8 | 55.6 | 525.4 (1 Failure) |
| Retarded C. 15 | 87.4 | 109.0 | 153.5 | 21.6 | 44.5 | 55.2 | 6987.5 |
| Below-Grade Group | 154.7 | 281.7 | 453.8 | 127.0 | 172.1 | 57.8 | 1130.8 (2 Failures) |
| Grade Group | 89.0 | 111.8 | 221.0 | 22.8 | 109.2 | 58.0 | 972.2 |
| Vth Grade | 96.7 | 112.0 | 278.9 | 15.3 | 166.9 | 63.4 | 972.2 |
| VIth Grade | 85.6 | 127.5 | 220.3 | 41.9 | 92.8 | 68.4 | 793.9 |
| VIIth Grade | 96.7 | 122.8 | 367.5 | 26.1 | 244.7 | 63.0 | 857.1 |
| VIIIth Grade | 72.8 | 97.6 | 114.0 | 24.8 | 16.4 | 58.0 | 648.6 |
| College Maids | 89.5 | 136.9 | 193.3 | 47.4 | 56.4 | 62.6 | 544.2 |

TABLE 34.

DIFFERENCES IN SUBSTITUTION SCORES*

Page 1.

| Differences between 25th, Median and 75th Percentiles | Accuracy | | | Index | | |
|---|---|---|---|---|---|---|
| | 25th | Median | 75th | 25th | Median | 75th |
| Maids & C.15 | 1.0+ | .8— | .2— | 6.8— | 8.1— | 19.0— |
| Maids & C.14 | 2.6+ | 3.4+ | 5.8+ | 4.8+ | 5.9+ | 5.0— |
| Maids & C.Ret. | 2.0+ | 4.0+ | 6.0+ | 14.4+ | 15.3+ | 4.7+ |
| Bedford 88 & C.15 | 1.0+ | .8— | 5.2— | 6.5— | 24.5— | 73.4— |
| Bedford 88 & C.14 | 2.6+ | 3.4+ | .8— | 6.0+ | 10.5— | 59.4— |
| Bedford 88 & C.Ret. | 2.0+ | 4.0+ | 1.0+ | 14.7+ | 1.1— | 49.7— |
| Grade Group & C.15 | 1.0+ | .2+ | 2.2— | 7.9+ | 5.6+ | 19.4— |
| Grade Group & C.14 | 2.6+ | 4.4+ | 3.8+ | 19.5+ | 19.6+ | 5.4— |
| Grade Group & Ret. C.14 | 2.0+ | 5.0+ | 4.0+ | 29.1+ | 29.0+ | 4.3+ |
| Below Grade & C.15 | 1.0— | 4.8— | 14.2— | 49.3— | 94.8— | 152.8— |
| Below Grade & C.14 | .6+ | .6— | 8.2— | 37.7— | 80.8— | 138.8— |
| Below Grade & C.Ret. 14 | 0.0 | 0.0— | 8.0— | 28.1— | 71.4— | 129.1— |

Page 4.

| Differences between 25th, Median and 75th Percentiles | Accuracy | | | Index | | |
|---|---|---|---|---|---|---|
| | 25th | Median | 75th | 25th | Median | 75th |
| Maids & C.15 | 2.0— | 11.2— | 17.1— | 4.2— | 33.0— | 54.0— |
| Maids & C.14 | 2.0— | 9.9— | 12.7— | 1.0— | 24.3— | 42.8— |
| Maids & C.Ret. | 2.0— | 10.0— | 12.0— | 1.5+ | 17.6— | 31.2— |
| Bedford 88 & C.15 | 0.0 | 13.2— | 25.1— | 11.3— | 53.6— | 195.7— |
| Bedford 88 & C.14 | 0.0 | 11.9— | 20.7— | 8.1— | 44.9— | 184.5— |
| Bedford 88 & C.Ret. | 0.0 | 12.0— | 20.0— | 5.6— | 38.2— | 172.9— |
| Grade Group & C.15 | 0.0 | 7.2— | 13.1— | 3.7— | 7.9— | 81.7— |
| Grade Group & C.14 | 0.0 | 5.9— | 8.7— | .5— | .8+ | 70.5— |
| Grade Group & Ret. C.14 | 0.0 | 6.0— | 8.0— | 2.0+ | 7.5+ | 58.9— |
| Below Grade & C.15 | 14.0— | 28.2— | 39.1— | 69.4— | 177.8— | 314.5— |
| Below Grade & C.14 | 14.0— | 26.9— | 34.7— | 66.2— | 169.1— | 303.3— |
| Below Grade & C.Ret. 14 | 14.0— | 27.0— | 34.0— | 63.7— | 162.4— | 291.7— |

* Plus signs indicate that the given group are better by so many seconds or per cents. of accuracy than the C. 14, C. 15, or C. Ret. 14 groups; minus signs that their records are poorer than the standards.

TABLE 35.

WOODWORTH AND WELLS' SUBSTITUTION TEST.

Average, Average Deviation and Range in Time-Scores of University Students, and Three Cottage Groups of Reformatory Subjects.

| Subjects | | First Half | Second Half | Whole |
|---|---|---|---|---|
| Eleven University students (men and women) tested by Woodworth & Wells. | Av. | 79.6″ | 65.1″ | 144.7″ |
| | A. D. | 9.0″ | 7.8″ | 12.5″ |
| | Range | 58″—94″ | 53″ — 83″ | 111″ — 177″ |
| Fourteen from Honor Cottage. | Av. | 112.8″ | 80.5″ | 193.4″ |
| | A. D. | 13.1″ | 14.1″ | 23.6″ |
| | Range | 96″—141.5″ | 74″ —119″ | 171″ — 260.5″ |
| Nineteen from Lowell Cottage. | Av. | 239.1″ | 137.0″ | 376.0″ |
| | A. D. | 192.7″ | 192.7″ | 255.5″ |
| | Range | 96″—840″ | 70.5″—460″ | 177.5″—1029.″ |
| Fourteen from Nursery Cottage. | Av. | 178.7″ | 137.2″ | 306.0″ |
| | A. D. | 79.7″ | 36.8″ | 60.5″ |
| | Range | 112″—360″ | 81″ —264″ | 195″ —566″ |

SECTION 10. COMPLETION OF SENTENCES.

(See Whipple's *Manual*, Test 46B.)

*Standard Method.* "*Materials:* A blank containing the beginnings of thirteen sentences, numbered from the bottom up. A piece of card-board the size of the blank. A stop-watch.

"The number of sentences—thirteen—was the accidental result of the fact that the first supply of blanks for the test was ordered from Stoelting of Chicago from Whipple's copy, and came in the form of two sheets, one containing twelve and one thirteen sentences, numbered from one to twenty-five. The twenty-five sentences seemed unnecessarily long and fatiguing, and so we used only the first page, which contained thirteen sentences. As in the opposite test, several forms were needed because of possible communication. The new forms had to have the same number of sentences as the old. The five forms are printed below.

| | a. | b. | c. |
|---|---|---|---|
| 13. | If some one happens | Because | If some child |
| 12. | The star | The story | The theatre |
| 11. | Because | Since | The reason why |
| 10. | If you do not | If you tell | Since |
| 9. | Smile | Run | I told |
| 8. | I hasten | I knew | Think |
| 7. | It was evening | In the morning | It was snowing |
| 6. | A stroke of lightning | An accident | The death of |
| 5. | When you have to | When you see | When you want |
| 4. | The house | The child | The factory |
| 3. | It rains | It seems | It is better |
| 2. | One must have patience | It is never right | One must never |
| 1. | I entered | I heard | The boy went |

| | d. | e. |
|---|---|---|
| 13. | In the evening | It is hard |
| 12. | The newspaper | A strange |
| 11. | I was sorry | Try |
| 10. | Letter writing | He asked me |
| 9. | The funeral of | The child learned |
| 8. | A flash of lightning | I do not like |
| 7. | If | The store |
| 6. | Our dog | This summer |
| 5. | The continuation school | A very good |
| 4. | It is fun | Before |
| 3. | Remember | In the rain |
| 2. | You ought not | Boys often |
| 1. | A year ago | When I |

"*Criticisms:* The five forms—like the opposite blanks—are not strictly standardized. In making them out, we tried to make them of equal difficulty, and of equal stimulating power, but there has been no true standardization of the pages. One defect, which can easily be seen, is that the pages are unequal in their tendency to call out complex sentences. There are some beginnings—at least one and not more than three—on each page which cannot be completed without forming a complex sentence, and there are others which may be made simple but are most naturally completed as complex sentences.

"*Method of administering the test:* The printed sheet, covered by the piece of card-board, was placed on the table in front of the child. The experimenter was supplied with a piece of paper numbered to correspond with the thirteen sentences to be used for recording association time, and a stop-watch, both screened from the child. The usual method of screening was by holding the child's folder with one half of it upright. All suggestion of speed or of timing was carefully avoided in giving this test. The instructions were given as follows: 'On this piece of paper under the card-board are the beginnings of some sentences. Just the first few words of the sentences are printed on the paper, and what I want you to do is to write something after those words which will complete the sentence. You know what a whole sentence is, don't you? You studied about that in grammar. You may write anything you wish which makes sense, but be sure that what you write forms a whole sentence, not just part of one. For instance, if you saw the words "The horse" on the paper, what could you write after that to make a whole sentence of it? (The answer either approved or criticized.) I will show you these beginnings of sentences one at a time, and you write anything you wish. Here is the first one.' At this point the experimenter pulls up the card-board, exposing the first sentence, with one hand, and starts the stop-watch with the other. The experimenter keeps his eye on the watch, and notes the number of seconds elapsing between the exposure of the words and the beginning of the writing, giving a rough measure of the association time for each sentence. No attempt was made to distinguish intervals less than two seconds. Since the timing and exposing process was rather difficult, each experimenter practised counting seconds as accurately as possible, and counted seconds from the time the sentence was exposed until he could get his eye on the watch. The longer intervals, therefore,—any longer than three or four seconds—were measured by the watch, while the shorter ones were often merely counted. For this reason fine distinctions of association time are not taken into account. No child was allowed more than 60 seconds to start any sentence. At the end of a pause of that length he was told to omit the sentence and go on to the next one. The time for the entire test was recorded, as well as the association times for each sentence.

"*Method of dealing with results:* The following measurements of the sentence test were recorded:

1. The number of sentences attempted.
2. The number of sentences correct. In marking correctness, only the form of the sentence was taken into account. A wrong tense, or the wrong form of adjective or adverb, or slang and colloquial phrases did not constitute wrong sentences. Only an error which rendered the result not really a sentence at all, classed it as wrong.
3. The number of simple and of complex sentences. The distinction in this case was made strictly in accordance to the grammatical rules for complexity.
4. The average number of words used in completing the sentences. Two averages were taken, in cases where one or more sentences were entirely omitted, one based on the entire thirteen sentences, and the other based on the number of sentences completed.
5. The number of ideas. In counting the number of ideas, the intention was to find out how many distinct ideas—exclusive of repetitions— were expressed on the page. Every noun, every verb other than forms of "to be," all auxiliaries of mood, every adjective, adverb, or personal pronoun, was counted a distinct idea. Personal pronouns when used in the singular and plural were counted both times, though differences of case were not counted. Mere conjunctions, auxiliary verbs of time, prepositions, or relative pronouns referring to words on the page, or modified forms of words already used, were not counted. A mere negation of an expressed idea was not counted. Words which were classed as nonsensical, that is, words which had no evident connection with the beginning of the sentence they were supposed to complete, were not counted as ideas. Words which were sensible, which, while not completing grammatically the printed beginning of the sentence, indicated a distinct idea in the child's mind were counted. It was found almost impossible for any two people to agree absolutely on a set of rules for marking ideas. After trying it for some time and finding differences of judgment which it seemed impossible to guard against, we decided to leave all the marking of ideas to one person. Accordingly, Mrs. Fischer, who was the final authority on all matters of evaluation, marked every sentence page for ideas.
6. The total time of the test was recorded in seconds.
7. The association times for the sentences were summed up in groups. The first group comprised all the sentences begun in two seconds or less; the second group included all those begun in three to five seconds, inclusive; the third group those begun in six to ten seconds inclusive; the fourth group those begun in eleven to twenty seconds inclusive; and the fifth group those begun in twenty-one to sixty seconds. Since there were so few long association times, these divisions seemed fine enough.
8. An index of ideas was calculated which consisted of the total time of the test, divided by the number of ideas. In other words, the index represents the average time per idea expressed.

Since the various factors of the sentence test which were evaluated had comparatively little relationship, it will be best to discuss the results for each one separately. Not all of the recorded measures were summarized."

After we had scored our records, Mrs. Fischer went over the first fifty of them. The differences between her scoring and ours proved negligible.

Of the 5 lists we used but 1, viz: list "d" since communication was ruled out for our group. Our subjects were unfamiliar with the continuation schools and so the 5th sentence of list "d" was changed to begin with "The State Reformatory."

It is to be recorded that we departed from the standard method in a fundamental aspect. Instead of avoiding all idea of speed we actually emphasized it. We said: "Take all the time you need to complete the sentences correctly, but do *not* waste a *single minute.* Be just as quick as you can." This error in method was the fault of our own notes and observation of the tests in the Cincinnati laboratory. As stated above Dr. Woolley had not yet reduced her directions to written form when this work was begun. It was in spite of the demonstration of the tests by her staff that the misapprehension arose.

To permit the force of stimulus words to have full play, the Cincinnati method is the only proper one. Yet, in spite of the request for speed the Bedford group were slower, not quicker, than the working girl and excelled the standard group in the number of ideas called for and in the number of sentences correctly written. Once more it is evidenced that the value of time is of secondary importance for the Reformatory group; the idea of speed carries less weight than the idea of correctness or the need for expression. This characteristic disregard for time is interesting, and a testing of a later group, where the standard conditions were fulfilled, showed that our urging of haste with the Bedford 88 made less difference than might be expected.

So many of the Bedford group were ignorant of the meaning of the term *sentence* that a fuller explanation was demanded for them than for the standard group. In illustration we used the same three sentences. In a set of preliminary tests we learned that, irrespective of whether a subject said that she knew what a sentence meant or not it was wise to take the precaution to ask of each—"How many sentences is this? 'I am sitting on the chair.' 'There is green pencil on the table.' And, how many sentences is this? 'I think it is going to rain for there are clouds in the sky.'" If the response was incorrect, we proceeded to explain as best we could what a sentence is, how in writing it begins with a capital letter and ends with a period, etc. We made no effort to point the distinction between a simple and a complex sentence; both were used in illustration in order to avoid setting either as a type. Beyond this additional explanation of the term sentence, the standard directions were given verbatim.

TABLE 36.

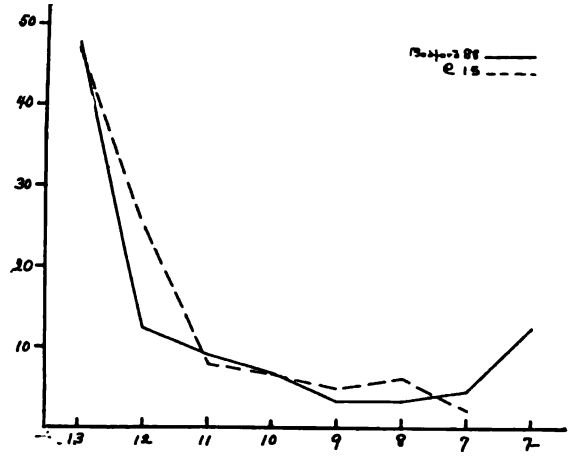
SENTENCES. NUMBER CORRECT OUT OF THIRTEEN.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls

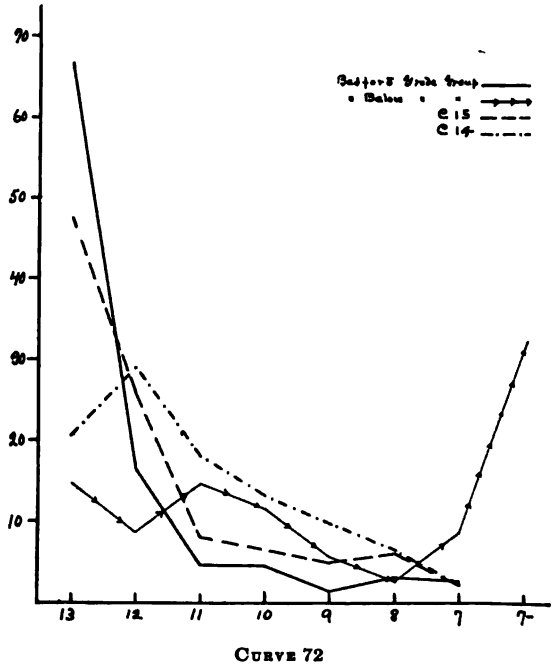
| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 13. | 12. | 10. | 1. | 2. | 13. | 1. (6 Failures) |
| C. 15 | 13.5** | 11.8 | 10.7 | 1.7 | 1.1 | 13. | 5. |
| C. 14 | 12.9** | 11.1 | 9.4 | 1.8 | 1.7 | 13. | 5.* |
| Retarded C. 14 | 12. | 11. | 9. | 1. | 2. | 13. | 5.* |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 11. | 10. | 6. | 1. | 4. | 13. | 1. (6 Failures) |
| Grade Group | 13. | 13. | 12. | 0. | 1. | 13. | 7. |
| Vth Grade | 13. | 12. | 12. | 1. | 0. | 13. | 7. |
| VIth Grade | 13. | 13. | 12. | 0. | 1. | 13. | 8. |
| VIIth Grade | 13. | 13. | 12. | 0. | 1. | 13. | 8. |
| VIIIth Grade | 13. | 13. | 13. | 0. | 0. | 13. | 10. |

*One complete failure—*i. e.*, only one correct.

**The percentiles were estimated as though 1 included measures up to 2.

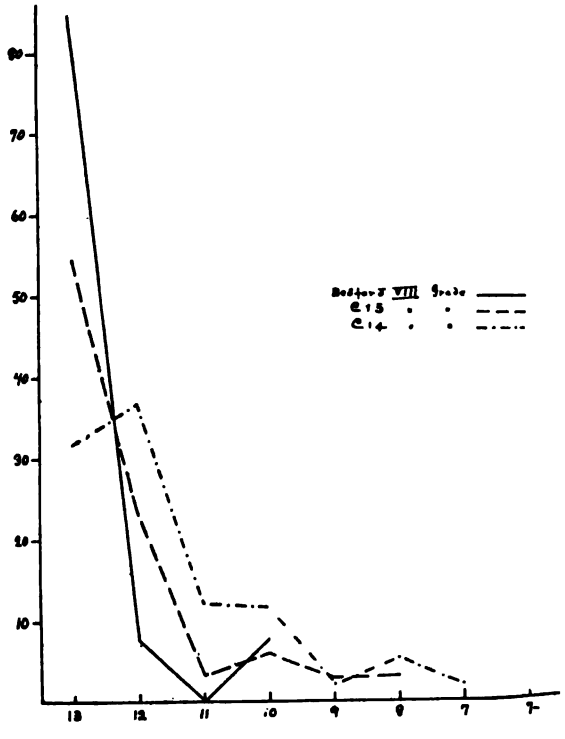



CURVE 71

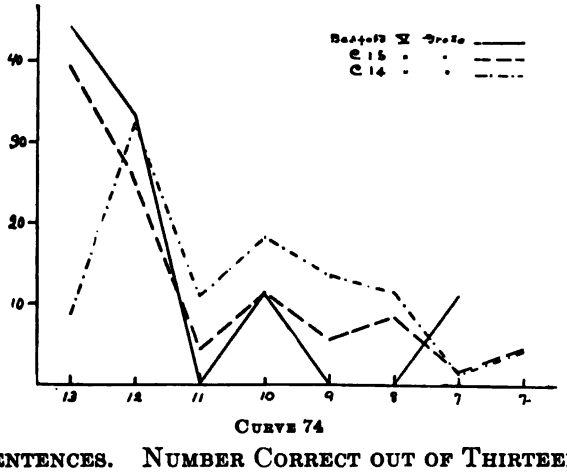



CURVE 72

SENTENCES. NUMBER CORRECT OUT OF THIRTEEN




CURVE 73




CURVE 74

SENTENCES. NUMBER CORRECT OUT OF THIRTEEN

*Results: 1. Number of Sentences out of Thirteen Correct.* The form of the curve for the Bedford 88 is bimodal, tho' less extreme in its distribution than the corresponding curve for most of the tests. The total 88 equal the C. 15 at the 25th percentile and median scores. Although slightly inferior to them at the 75th percentile, they are superior to the C. 14.

It was fully expected that the Reformatory women would compare unfavorably with the working girl in capacity to complete sentences correctly. In this, with the exception of the poorest quarter, they disappointed us. The Grade Group, with its equivalent education, wrote at the median score as many sentences correctly as did the working girl at the 25th percentile. The 75th percentile record is slightly better than the median of the C. 15 and the poorest score excels the standard by two sentences correctly written. The curves for the 8th and 5th grades parallel very closely the standard curves for the same grades. (See Curves 73 and 74.)

The Below-Grade Group, on the other hand, is poorer even than the Retarded C. 14 girls by one, one, and three sentences at the three percentiles, respectively. In the standard group the poorest score is five sentences correctly written; in the Below-Grade Group there are five failures and a number of scores less than five sentences correct.

This phase of the test served to set off the Grade Group and the Below-Grade Group as two distinct groups. How little overlapping there is between the two groups may be seen in Curve 72. The Grade Group excels the Below-Grade Group at the three percentiles by one, two and six sentences correctly written. The 25th percentile record of the Below-Grade Group is poorer by one sentence than the 75th percentile of the Grade Group. Or, to state the degree of overlapping more exactly, 83.1 per cent. of the Grade Group write as many or more sentences correctly than do the best 23.5 per cent. of the Below-Grade Group. The poorest score of the Grade Group is seven sentences correctly written, the poorest score of the Below-Grade Group is failure.

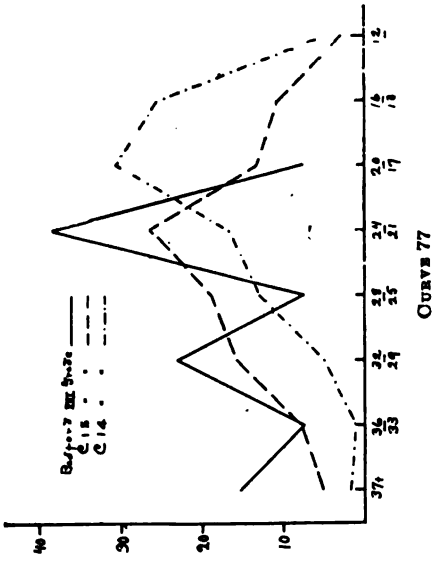
TABLE 37.

SENTENCES. NUMBER OF IDEAS.

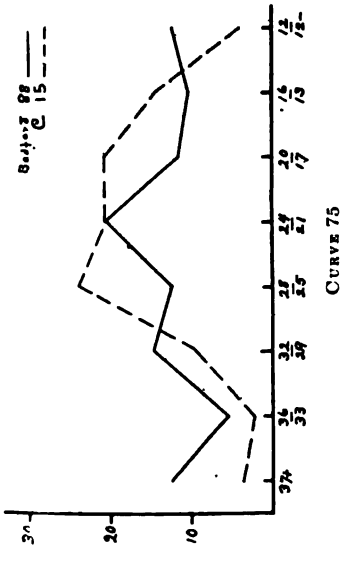
Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 31. | 24. | 18. | 7. | 6. | 48. | 7. (6 Failures) |
| C. 15 | 27.3 | 22.7 | 17.7 | 4.6 | 5.0 | 46. | 8. |
| C. 14 | 21.7 | 17.5 | 14.2 | 4.2 | 3.3 | 39. | 7. (1 Failure) |
| Retarded C. 14 | 21. | 17. | 14. | 4. | 3. | 37. | 7. (1 Failure) |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 24. | 17. | 10. | 7. | 7. | 37. | 7. (6 Failures) |
| Grade Group | 33. | 28. | 23. | 5. | 5. | 48. | 11. |
| Vth Grade | 30. | 28. | 24. | 2. | 4. | 37. | 11. |
| VIth Grade | 34. | 30. | 22. | 4. | 8. | 43. | 16. |
| VIIth Grade | 36. | 27. | 23. | 10. | 4. | 48. | 13. |
| VIIIth Grade | 32. | 27. | 24. | 5. | 3. | 41. | 20. |

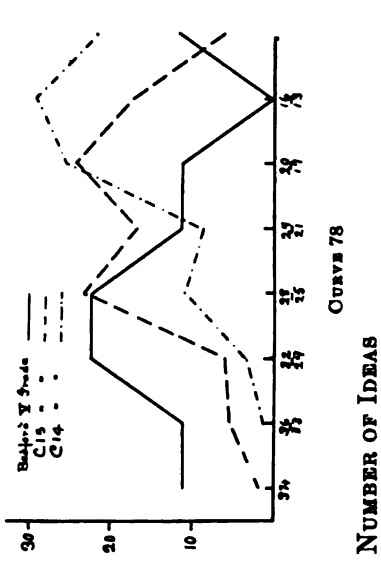
*2. Number of Ideas.* As with the number of correct sentences, so with respect to the number of ideas suggested by the beginning of these thirteen sentences, the Reformatory women are slightly superior at all three percentiles to the working girl of fifteen (see Curve 75). The percentiles and Curve 76 point to a separation of the Grade and Below-Grade Groups here, too. When one checks the records of the C. 15 and the Reformatory Grade Group the better 50 per cent. of the latter are better than the 25th percentile of the standard, the 75th percentile better than the standard median, and the lowest record of all is richer by three ideas than the poorest record of the C. 15. Only the best 29.4 per cent. of the Below-Grade Group equal or surpass the number of ideas expressed by the 75th percentile score of the Grade Group. The difference between the various grade groups among the Reformatory subjects is greatest with



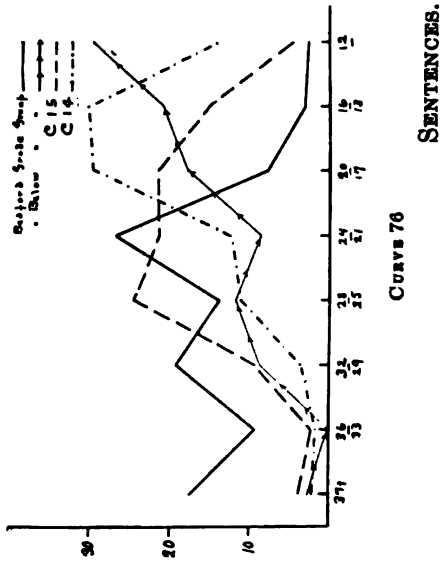
CURVE 77



CURVE 75



CURVE 78



CURVE 76

SENTENCES. NUMBER OF IDEAS

respect to the "fewest number of ideas" expressed. Neither among our subjects nor the standard, however, is the correlation for the separate grades as positive a one as in the other tests. The fact that the Grade Group express more ideas than the standard group is less surprising than their superiority in the other phases of this test. Their arrest and separation from their family and friends has made them introspective. They are eager to find out about the Reformatory and possibilities for their release. They have been put in quarantine, where they have been unable to talk to anyone for a number of days. During the preceding tests they were not allowed to discuss their problems, then in this test certain of the stimulus words suggest experiences in their lives and furnish a basis for self-expression. "A year ago," "I was sorry," "Our dog," etc., precipitate such sentences as "A year ago I was traveling in Washington and I was having a grand time in a theatrical show," "I was sorry that I didn't mind my mother and stay home like she told me last year for I wouldn't be here," "Our dog is a little brown dog and he has a house in the yard and my brother plays with him fine."

*3. Index of Ideas.* The distribution of scores in this test is again bimodal (see Curve 79). The criminal woman at the 25th percentile and the median expresses her ideas more rapidly than does the working girl of fifteen, but at the 75th percentile she is decidedly slower. This tendency for the good records to be better and the poor records to be poorer than the standard is particularly obvious in Curve 80, from which curve it may be seen that the Below-Grade Group is so inferior to the Grade Group that approximately 70 per cent. of them require at least twice the time to think of each idea as the poorest quarter of the Grade Group, or as does the median working girl. The fact that we urged our subjects to hurry makes the slowness all the more striking. The Grade Group is much quicker than the C. 15 at all percentiles and in its best and poorest scores. The index of ideas is a little better for each grade from the 5th to the 8th and the several Reformatory grades are slightly superior to, but coincide pretty closely with, those of the C. 15 (see Curves 81 and 82).

TABLE 38.

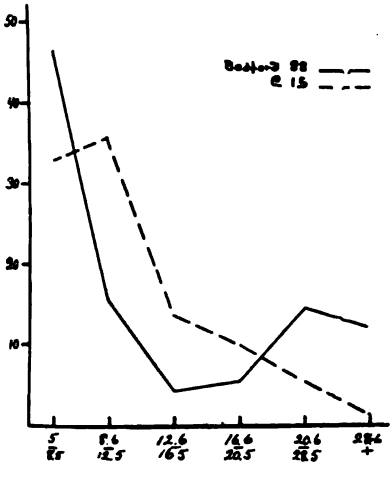
SENTENCES. INDEX OF IDEAS.

Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls.

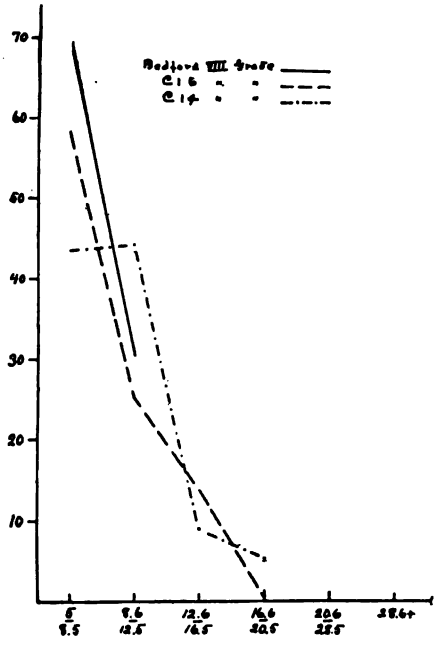
| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 6.3 | 9.5 | 22.0 | 3.2 | 12.5 | 3.4 | 40.4 (6 Failures) |
| C. 15 | 8.1 | 10.2 | 14.7 | 2.1 | 4.5 | 4.2 | 90. |
| C. 14 | 8.3 | 10.7 | 14. | 2.4 | 3.3 | 4.9 | 42. (1 Failure) |
| Retarded C. 14* | | | | | | | |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 8.2 | 22.6 | 35.5 | 14.4 | 12.9 | 5.7 | 40.4 (6 Failures) |
| Grade Group | 5.7 | 7.8 | 10.8 | 2.1 | 3.0 | 3.4 | 39.4 |
| Vth Grade | 9.3 | 10.0 | 16.0 | .7 | 6.0 | 5.9 | 27.4 |
| VIth Grade | 6.4 | 8.9 | 14.6 | 2.5 | 5.7 | 3.8 | 24.7 |
| VIIth Grade | 5.5 | 6.1 | 9.2 | .6 | 3.1 | 3.4 | 39.4 |
| VIIIth Grade | 5.2 | 6.5 | 9.1 | 1.3 | 2.6 | 4.5 | 11.2 |

* We lacked the data necessary to compute these percentiles.

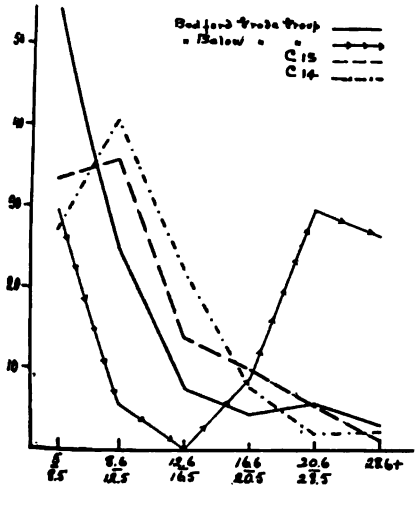
*4. Number with an Association Time of Two Seconds.* The records of the number of sentences begun in two seconds is altogether in favor of the working girls. In spite of the fact that they were not told to hurry while our subjects were told to do so, even the retarded ones among them at the ages of fifteen and fourteen formulated and began to write a larger number of sentences in two seconds than did the Reformatory subjects. This tendency to be slow in their thinking characterizes alike the Grade and Below-Grade Reformatory groups. The VIIth and VIIIth Grades are superior to the C. 15 girls as



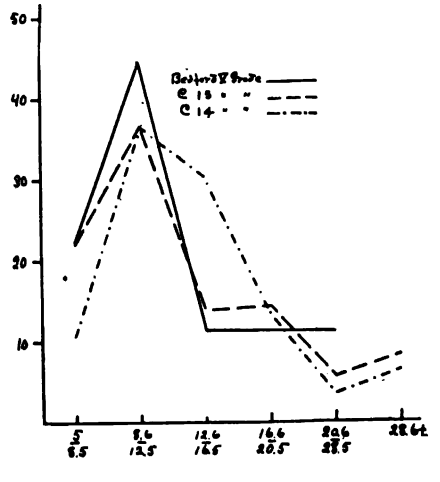
CURVE 79



CURVE 81



CURVE 80



CURVE 82

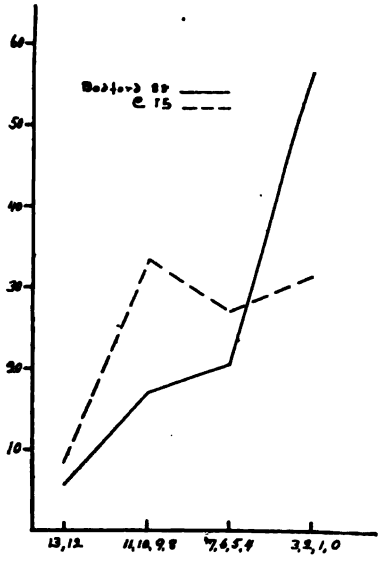
TABLE 39.

SENTENCES. NUMBER WITH AN ASSOCIATION TIME OF 2 SECONDS OR LESS.

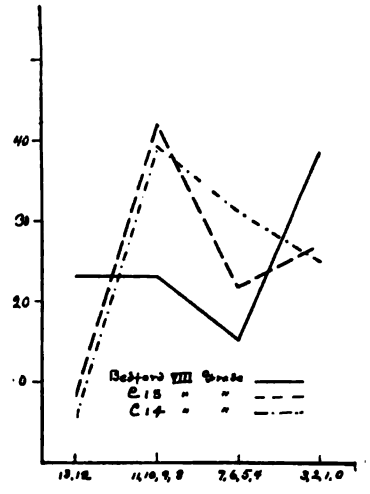
Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups and for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 7. | 2. | 0. | 5. | 2. | 12. | 0. |
| C. 15 | 7.9 | 4.9 | 1.4 | 3.0 | 3.5 | 13. | 0. |
| C. 14 | 7.6 | 4.7 | 2.2 | 2.9 | 2.5 | 13. | 0. |
| Retarded C. 14 | 8. | 5. | 3. | 3. | 2. | 13. | 0. |
| Retarded C. 15 | | | | | | | |
| Below-Grade Group | 4. | 2. | 0. | 2. | 2. | 10. | 0. |
| Grade Group | 8. | 3. | 1. | 5. | 2. | 12. | 0. |
| Vth Grade | 3. | 1. | 0. | 2. | 1. | 6. | 0. |
| VIth Grade | 7. | 2. | 1. | 5. | 1. | 12. | 0. |
| VIIth Grade | 10. | 7. | 1. | 3. | 6. | 12. | 0. |
| VIIIth Grade | 10. | 7. | 3. | 3. | 4. | 12. | 0. |

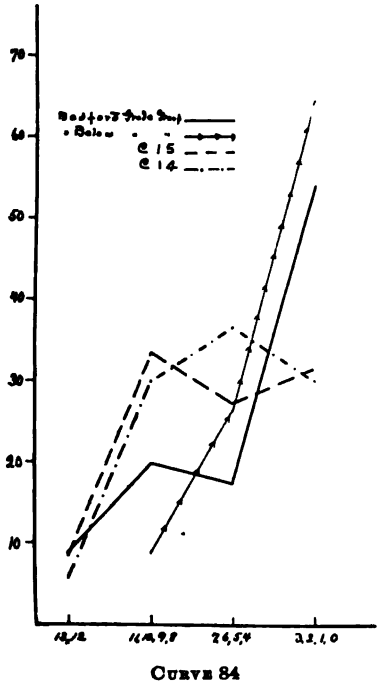
a whole, but inferior to the corresponding groups among the working children. This is conspicuously true of the Vth Grade (see Curve 86). If the last division on the scale of Curve 84 had broken the number of sentences begun in two seconds into two groups, separating out the one and the zero sentences and representing them at a point by themselves, the curve for the Grade Group would have been more clearly differentiated from that of the Below-Grade Group than it is at present. The percentiles show that 50 per cent. of the Below-Grade Group begin at the most not more than two sentences in two seconds.



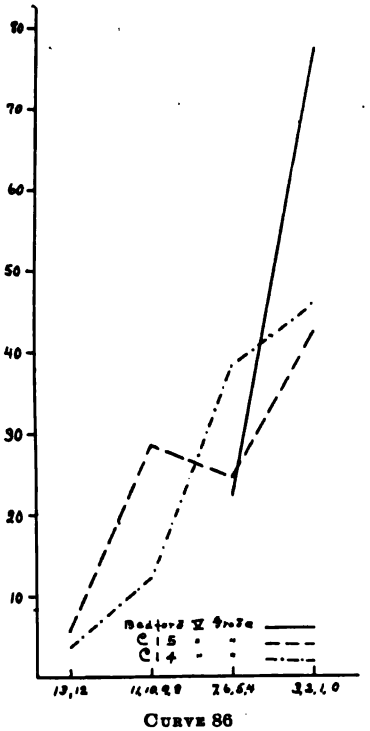

CURVE 83




CURVE 85




CURVE 84




CURVE 86

SENTENCES. NUMBER WITH AN ASSOCIATION OF TIME OF 2 SECONDS OR LESS

SECTION 11. ASSOCIATION BY OPPOSITES.

(See Whipple's *Manual*, Test 34c.)

*Standard Method.* "*Materials:* A page containing twenty words, printed one under another at the left side of the page. A stop-watch.

Seven[1] such pages were used, as follows:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Good | Bad | Front | Strong | Inside | Worst | Wise |
| Outside | Inside | Safe | Best | Tall | Never | Joy |
| Quick | Slow | Awake | Always | Enemy | Dry | Upper |
| Tall | Short | Raw | Front | Big | Foolish | New |
| Big | Little | Shut | Wet | Good | Weak | Busy |
| Loud | Soft | Easy | Foolish | Sorry | Distant | Generous |
| White | Black | Rude | Pretty | Sick | Slow | Vacant |
| Light | Dark | Winter | Dead | Poor | Kind | Tender |
| Happy | Sad | Low | Honest | Similar | Horrid | Regular |
| False | True | Day | Cross | False | Cheap | Stale |
| Like | Dislike | Sharp | Bright | Prompt | Left | Absent |
| Rich | Poor | Late | Safe | Black | Honest | Heavy |
| Sick | Well | Stupid | Smooth | Soft | Dull | Even |
| Glad | Sorry | Old | Summer | Rough | Pleasant | Certain |
| Thin | Thick | Sunny | High | Narrow | Rough | Love |
| Empty | Full | After | Easy | Evening | Dirty | Few |
| War | Peace | Short | Long | Stout | Quiet | Raise |
| Many | Few | Right | Polite | Rapid | Soft | Silent |
| Above | Below | Lazy | Lazy | Peace | Ugly | Shallow |
| Friend | Enemy | Alive | Right | Few | Patient | Orderly |

"The first four lists were easier than the last three. The first four were used in the 14-year series, and the last three in the 15-year.

"*Criticism:* We are convinced that the test is one which is decidedly modified by communication. It seemed very necessary, therefore, to have several blanks, but it was impossible for us to standardize them with any accuracy. The first four are easier than the last three, and do not differ very much in difficulty. Of the last three, the one beginning 'Wise' is the hardest.

"*Method of administering the test:* The experimenter began as follows: 'Do you know what I mean when I say that one word means just the opposite of another word? For instance, what is the opposite of hot?' If the correct answer was received, the experimenter continued with *up* and *straight* as additional illustrations. None of these words appear on any of the test sheets. If the experimenter did not receive the correct answer to his original question, he tried to explain the matter further. Sometimes it was necessary to tell the child that *cold* was the opposite of *hot*, and then try the other illustrations. Occasionally we had to resort to such leading questions as the following: 'If you are moving in an elevator, and are not going up, in what direction are you going?' A child who needed that kind of explanation, however, never made a success of the test. When the experimenter felt that the child understood the test as well as he was able, he continued as follows: 'On the other side of this piece of paper there is a list of words printed one under another. What I want you to do is to write on the paper after each word, the word that

[1] Since this went to press the monograph of Woolley and Fischer has appeared and contains eight instead of seven lists of opposites The added list is the third in that monograph, so that what is list five here is list six of those actually printed by Woolley and Fischer.

means just the opposite of the one you see there. For instance, if you saw *hot* there, what would you write after it? Yes. Now begin at the top and take the words in order. If you pass one, you can't go back to it, so try to get each one as you go along, and do it as fast as you can.'

"The stop-watch was started as the child looked at the first word and stopped as he finished writing the last one. The experimenter sat with his eye on the stop-watch, and told the child to pass on to the next word in case he paused more than 30 seconds on any one word.

"*Method of dealing with results:* For each list of words, a list of opposites which were to receive full credit and of those to receive half credit, was made out. Misspelled words were not counted as incorrect, but in case of change of form, *e. g.* adverbs used for adjectives, one-half credit only was given. The list was made up gradually as the papers were marked. Each new case was made the subject of consultation, but the final decision always rested with Mrs. Fischer, who supervised all the evaluating. The result of the test was recorded each time in terms of the time of the total test, and the accuracy of the series in per cents. In this case, a combined measure of time and accuracy was of comparatively little significance. The accuracy was the important measure. Children who were uncertain and inaccurate were usually slow, and there was no reason to think they could have done much better by taking more time. The table of results and the comparative errors are accordingly based on the percentage of accuracy."

In the Laboratory of Social Hygiene, List 5 only was used.

We reversed the model pair of opposites *hot—cold* and instead of asking "What is the opposite of *hot*?" we asked "What is the opposite of *cold*?" This was done because subjects who are as dull as many of ours persist in mistaking *hot* for *heart* or *hard*, which is undesirable because *soft—hard* happened to be one of the pairs of the regular test lists.

Dr. Woolley refers to the fact that a few among the working girls had to be told that *cold* was the opposite of *hot* and that leading questions and illustrations had to be used in further explanation. This need of further explanation was true, not of a few, but of many of the Reformatory group, some of whom when once they understood did not do so badly in the test. It was found illuminating to postpone the explanation, even when a blind response was made to the first word, until after the opposite to all three illustrative pairs had been asked for, because some who couldn't see at first came later of their own accord to appreciate what was wanted and needed no further explanation. For this reason we departed from the standard directions by asking for all three model words before taking it for granted that it was necessary to explain what was meant by the opposite to a word. This permits one to discriminate better between those

who are merely slow, but capable of seeing the point of the test for themselves, and those who cannot comprehend what is meant by 'opposite' until it is explained. If the correct response was given to one of the three, the others were repeated; if these responses were correct, the test was continued according to the standard; if not, we proceeded in this wise: "By opposite I mean the *very most different* thing you can think of. What is the very most different thing from *cold*? From *up*? From *crooked*?" If these were not correct, the explanation was continued. "If you are in an elevator and it is not going up, which way is it going?" The reply was almost always "down." "That's what we mean by opposite. *Up* and *down* are opposite. Now what is the opposite of *cold*? Of *crooked*?" If the reply was still incorrect, we asked, "If an elevator isn't going up, it is going ——?" "Down." "If the weather isn't cold, it is ——?" "Warm" (most frequent reply). "Yes, warm or hot. Now *up* and *down* are opposites and *cold* and *warm* are opposites, so what is the opposite of *crooked*?" If this was a failure, the experimenter began again and went through all the explanation a second time, repeating it until it was certain that the subject could not appreciate what was meant by an opposite. When an individual is very dull, merely telling her the opposite of a word or two does no good, whereas it is often possible to make her comprehend the idea, by repeating the explanation. Such laborious explanation is worth while, since it secures a series of scores varying from 5 per cent. to 50 per cent. correct, instead of a large number of total failures. In this way there are secured relatively small individual differences in maximal capacity to comprehend and retain the idea of logical association by opposites through a series of twenty words. Some lose the idea entirely after the first word or two; some keep it until deflected by a difficult word; others alternate it with words that are associated by similarity throughout the entire list.

To minimize any difficulties due to unequal skill in reading and spelling we added to the standard directions as follows: "If there is a word you cannot read, ask me and I'll tell you what it is. If you can't spell correctly a word you want to write, it doesn't matter; I will know what you mean. If you

can't spell it at all, ask me and I'll tell you." In no instance was the experimenter asked to spell or pronounce a word by any of the 54 subjects who had finished at least the 5B grade in school. Of the 34 who had less schooling than this—the Below-Grade Group—the following were helped as indicated in Table 40.

TABLE 40.

NUMBER OF WORDS WHICH THE EXPERIMENTER

| Subject | Pronounced | Spelled | Wrote |
|---|---|---|---|
| 112 | 3 | 0 | 0 |
| 127 | 9 | 0 | 0 |
| 24 | All | 0 | All |
| 29 | 11 | 5 | 0 |
| 42 | All | 0 | All |
| 102 | 10 | 0 | All |
| 20 | All | 0 | All |
| 53 | All | 0 | All |
| 81 | All | 0 | 0 |
| 91 | All | 0 | All |
| 104 | All | 0 | All |
| 114 | 10 | 4 | 0 |
| 18 | All | 0 | All |
| 35 | All | 0 | All |
| 44 | All | 0 | All |
| 64 | All | 0 | All |

The correlation was so high between the time and the accuracy for those who needed no help in reading and writing ($r$ + .83, P.E. = .029), we decided to estimate the time for those subjects who could not read or write at all to be like that of the record corresponding most nearly to theirs in accuracy. In so far as speaking a word brings a higher chance of accuracy, these results are probably placed higher in the scale than they should be. Until the relative differences between the probable accuracy of response to a list when its stimulus words are spoken or printed have been determined, this is a source of error that cannot be accurately compensated for.

As a matter of fact with another similar list which was pronounced to the subject to which her response was verbal the accuracy was proportionally higher than were the written response to the printed list. Individual differences, however, were less evident, and, what is more significant from the point of view of method, the results correlated less closely with the

general efficiency and intelligence of the women. The greater individual variation that results from the method used in the Bureau of Vocational Guidances is due, we believe, not so much to unequal ability to read and write, as to individual differences in ability to comprehend what is read. Even after they have pronounced the stimulus word and although the final writing of the response may not be difficult for them, the response is delayed. When the words are spoken to them, on the other hand, they comprehend the meaning more quickly. The duller ones, who could not be made to understand the idea of opposites, gave fairly prompt free-association responses, which frequently happened also to be the opposite. Whereas with us it makes little difference in the speed and the accuracy of the actual association whether we read or hear the word *bad, long,* or *black,* to these women it seems to make not a little, and, as the degree of their intelligence decreases, they apprehend the visual with increasing laboriousness in comparison to the auditory cue. There seems little doubt but that they are more deficient in control of material that comes to them through visual, than through auditory channels.

In addition to the group above referred to, to whom the test list of *auditory-verbal* opposites was given, the Binet group of 200 was also given such a series of ten easy opposites. Two records among the 200 were incomplete, so that the tables are made on the basis of 198 records. The words were given in the following order: *good, outside, quick, tall, big, loud, white, light, happy, false.*[2] The words were pronounced by the experimenter and if the correct response had not been given after a pause of ten seconds, the word was marked a failure. Each word entirely correct received a value of 10 and each half-right a value of 5. Eighty-five per cent. of the test must be correct to receive credit in the Binet series. The list contains no word as hard as *similar, peace* or *prompt* of the Bureau of Vocational Guidance list. For the pairs of opposites that are on both lists, namely, *good—bad, outside—inside, tall—short, big—little,*

[2] For details of method, see the Binet-Simon Measuring Scale for Intelligence. *The Training School,* January, 1910, p. 13.

*white—black, false—true*, the per cent. of wrong responses to the visual stimuli, that is, when the list is given to the subject in printed form, is from two to three times as high as when the list is read to our subjects. (See Table 41.) Even so, when

TABLE 41.

PER CENT. OF FAILURES TO TEN VERBAL OPPOSITES AMONG 198 REFORMATORY SUBJECTS.*

| | Failures | | Errors | |
|---|---|---|---|---|
| | No. | Per Cent. | No. | Per Cent. |
| Outside | 13 | 6.6 | 0 | 0.0 |
| Tall | 13 | 6.6 | 21 | 10.6 |
| Big | 14 | 7.1 | 25 | 12.6 |
| Good | 16 | 8.1 | 3 | 1.5 |
| Light | 20 | 10.1 | 2 | 1.0 |
| White | 22 | 11.1 | 6 | 3.0 |
| Happy | 26 | 13.1 | 9 | 4.5 |
| Quick | 29 | 14.6 | 5 | 2.5 |
| Loud | 32 | 16.2 | 13 | 6.6 |
| False | 69 | 34.9 | 6 | 3.0 |

the stimulus word is not presented in printed form and no writing of the response is involved, the ability to give the correct opposite of these words when they are read to the subject is much below the normal. Fifty-four per cent. fail in the test, that is, they do not give the correct opposite to seven or more of the words. Twenty-four have a score of ninety-five to one hundred per cent.; twenty-two per cent. a score of eighty-five to ninety per cent.; twenty per cent. a score of seventy-five to eighty per cent. and eleven, seven, six, two, and nine per cent. have scored respectively sixty-five to seventy, fifty-five to sixty, forty-five to fifty, thirty-five to forty, and less than thirty-five per cent. correct. The percents at the various Binet ages who pass this test are as follows:

| | 6 yrs. | | 7 yrs. | | 8 yrs. | | 9 yrs. | | 10 yrs. | | 11 yrs. | | 12 yrs. | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| No. plus | 0 | 0 | 2 | 14.3 | 2 | 15.4 | 9 | 19.6 | 39 | 52.7 | 39 | 81.3 | 1 | 100 | 92 | 46.5 |
| No. minus | 2 | 0 | 12 | 85.7 | 11 | 84.6 | 37 | 80.4 | 35 | 47.3 | 9 | 18.7 | 0 | | 106 | 53.5 |
| No. tested | 2 | | 14 | | 13 | | 46 | | 74 | | 48 | | 1 | | 198 | |

* For corresponding Figures for Bedford 88 and College Maids see Table 43.

Only twenty per cent. of those who test nine, whereas fifty-three per cent. of those who test ten, and eighty-one per cent. of those who test eleven pass this test. This test was given also to a group of normal-school adult students, all of whom passed the test, with only an occasional error. All but one of the 198 tested in the Binet series has an average reaction time that is slower than the slowest time (1.5 seconds) of response among the college students tested by Woodworth and Wells.[3] The average times do not include the failures. They are the average

TABLE 42.

CREDITS GIVEN TO DIFFERENT RESPONSES IN OPPOSITES TEST

| | Full Credit | Half Credit |
|---|---|---|
| INSIDE | outside; outdoors | *out* |
| TALL | short; low | little; tiny; *small* |
| ENEMY | friend; *lover* | |
| BIG | little; small; tiny | short |
| GOOD | bad; evil; poor | *worst* |
| SORRY | glad; happy | |
| SICK | well; healthy | |
| POOR | rich; wealthy; well-to-do; good | |
| SIMILAR | dissimilar; unlike; different | *unsimilar; opposite; contrary* |
| FALSE | true; real; natural; faithful | truthful; *right; truth; good* |
| PROMPT | late; tardy | slow; delayed |
| BLACK | white | clean; light |
| SOFT | hard | harsh; *rough* |
| ROUGH | smooth; *gentle; tender; genteel* | good; even; soft |
| NARROW | wide; broad | large |
| EVENING | morning; dawn | day; light |
| STOUT | thin; weak; slim; *skinny;* lean | small; light; frail |
| RAPID | slow; sluggish | *slowly* |
| PEACE | war; *strife* | fight; trouble; *disturbance; noise; quarrelling* |
| FEW | many; lots; most; several; a number | much; more; crowd; *plenty* |

[3] Op. cit., p. 65.

reaction time of the responses given in less than ten seconds. The reformatory subject is very slow even in verbal response to spoken opposites.

Table 42 is one that Mrs. Fischer furnished us for evaluating the responses to list five. The words italicized are the ones which were not on her list and were scored without her advice. Those listed in the first column received full credit, *i. e.* 5 per cent. each; those in the second column, receive half-credit, *i. e.* 2.5 per cent. each.

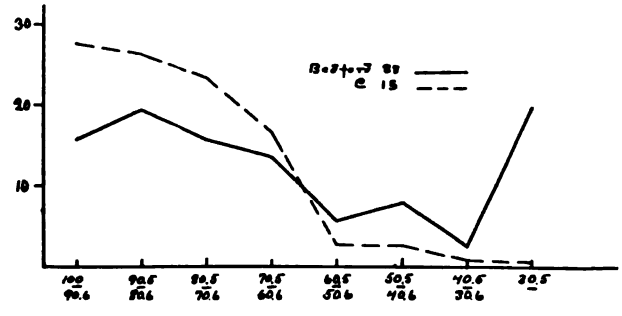
TABLE 43.

ASSOCIATION BY OPPOSITES. ACCURACY IN PER CENTS.

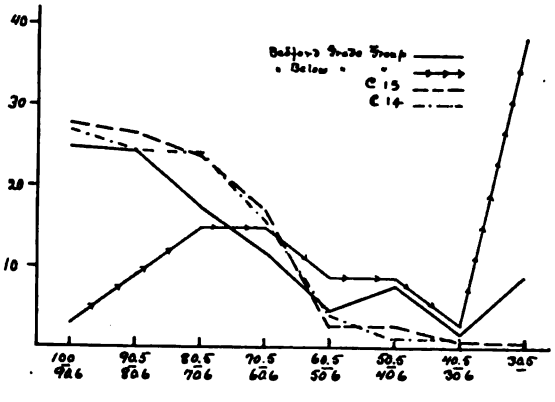
Percentiles, Quartile Variation and Limiting Scores for Bedford 88, Below-Grade Group, Grade Group, Vth, VIth, VIIth and VIIIth Grade Groups, for the Standard Cincinnati Groups of 14, 15, and Retarded 14 and 15-year-old Working Girls, and College Maids.

| Group | 25th Percentile | Median | 75th Percentile | Dif. bet. Median and 25th Percentile | Dif. bet. Median and 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|---|---|
| Bedford 88 | 87.5 | 72.5 | 45.0 | 15.0 | 27.5 | 100. | 5. (9 Failures) |
| C. 15 | 88.9 | 80.0 | 71.2 | 8.9 | 8.8 | 100. | 7.5 |
| C. 14 | 88.9 | 79.5 | 70.3 | 9.4 | 9.2 | 100. | 20.0 |
| Retarded C. 14 | 87.5 | 75.0 | 67.5 | 12.5 | 7.5 | 100. | 22.5 |
| Retarded C. 15 | 87.5 | 77.5 | 70.0 | 10.0 | 7.5 | 100. | 7.5 |
| Below-Grade Group | 72.5 | 50.0 | Failure | 22.5 | 50.0 | 92.5 | 5. (9 Failures) |
| Grade Group | 90.0 | 81.2 | 65.0 | 8.8 | 16.2 | 100. | 5.0 |
| Vth Grade | 87.5 | 72.5 | 50.0 | 15.0 | 22.5 | 92.5 | 5.0 |
| VIth Grade | 86.2 | 71.2 | 46.2 | 15.0 | 25.0 | 90. | 30.0 |
| VIIth Grade | 93.7 | 83.7 | 70.0 | 10.0 | 13.7 | 100. | 22.5 |
| VIIIth Grade | 95.0 | 90.0 | 72.5 | 5.0 | 17.5 | 97.5 | 65.0 |
| College Maids | 90.0 | 86.2 | 62.5 | 3.8 | 23.7 | 100. | 10. |

*Results*: The Bedford 88 are slightly less accurate at the 25th percentile, 7.5 per cent. less so at the median, and decidedly so—26.2 per cent.—at the 75th percentile than the working girl of

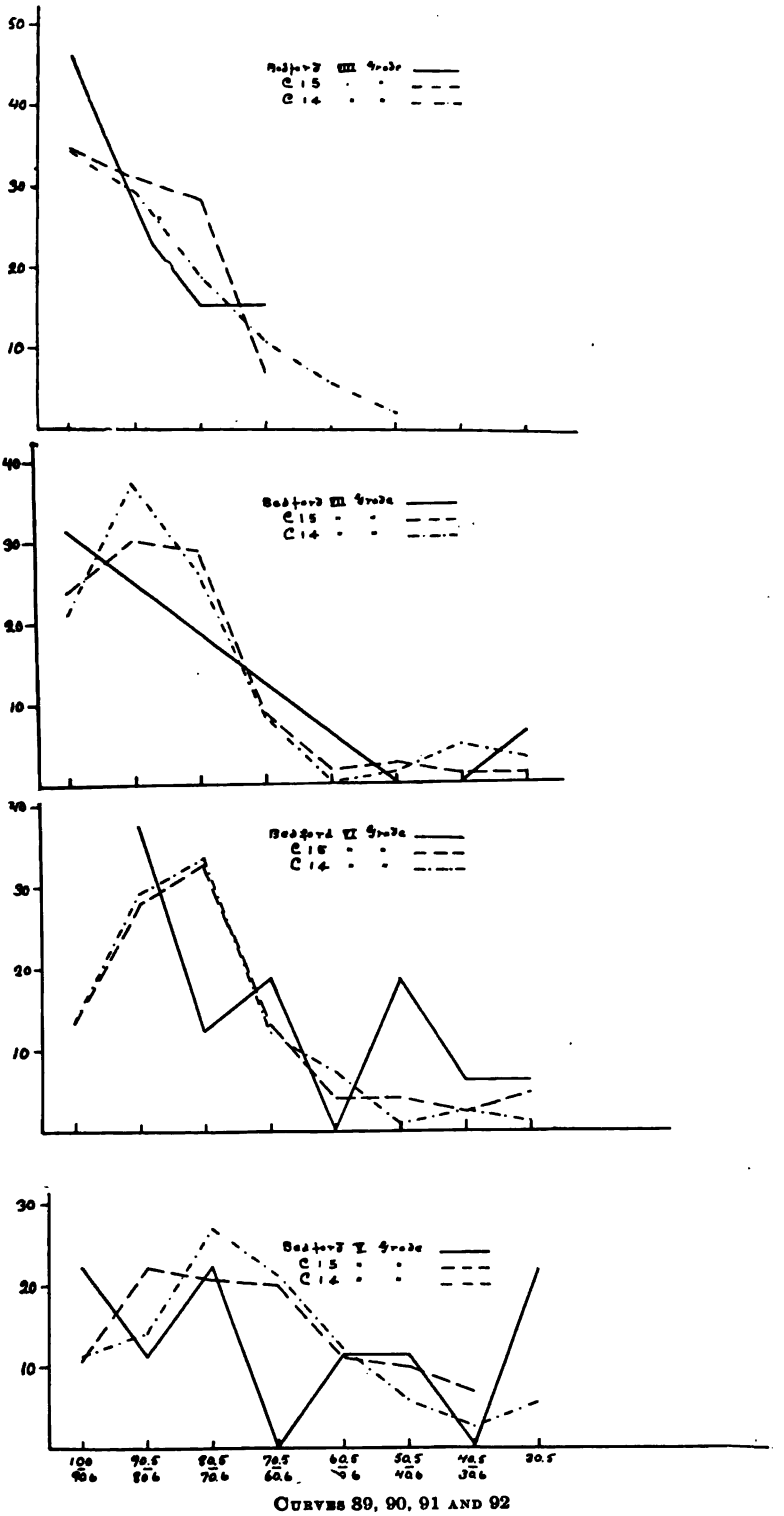



CURVE 87




CURVE 88

OPPOSITES ACCURACY




CURVES 89, 90, 91 AND 92

OPPOSITES ACCURACY

fifteen. While the lowest record among the latter is 7.5 per cent. correct, there are nine failures among the former. Percentiles and curves have been formulated for the standard group in accuracy only.

It is evident in Curve 87, as in the curves of the Bedford 88 in the other tests, that the distribution of the total scores differs from that of the standard group, in that there is a higher per cent. of poorer records. When, however, the women are divided into two groups according to the school grade they had succeeded in passing upon leaving school, Curves 88 and 89 are the result, and, as usual, it proves to be those who had not passed beyond the 5B grade who are responsible for the majority of the lower scores, while the curve of those subjects who had succeeded in passing grades as high as those passed by the standard group, coincides on the other hand with that of the C. 15. These two groups—the Grade Group and the Below-Grade Group—overlap very little; not more than 11 per cent. of the Below-Grade Group are as accurate as the better 50 per cent. of the Grade Group, while two-thirds of them are as inaccurate as the lowest quarter of the Grade Group. The percentiles of the Grade Group also correspond closely to those of the C. 15, if one bears in mind the basis for the estimation of the latter and that their percentiles in consequence sometimes fall below or above any actual score. In ability to form these simple logical associations, then, the Grade Group equals the working girl of fifteen, but has not developed beyond the point attained by her at that age. Neither have the College Maids outdistanced the working girls; their 25th percentile record is identical, the median only slightly better, and the 75th percentile a little poorer than the C. 15.

It is true, as Dr. Woolley points out, that there is a close correspondence among normal individuals between the accuracy of their response and the time involved. There is also a very high positive correlation between the rank in time and in accuracy for the Reformatory subjects ($r = +.83$, P.E. $= .029$) but, more of them attain a degree of accuracy equal to the best and intermediate standard scores than equal their quickest and intermediate scores in time. Moreover, the time scores for

those of our subjects whose accuracy corresponds to that of a given range among the standard group are longer than theirs, and these absolute differences in time become greater as the accuracy decreases. To take a concrete example, the accuracy of the eighteenth subject (arranged in the order of the per cent. correct) has lost only 10 per cent. of the accuracy of the best subject, whereas the eighteenth individual in the series ranked with respect to the time has increased her time score by 76 per cent. of the time consumed by the quickest individual.

On the basis of variation in accuracy, however, individual differences are more marked in this test than in the accuracy scores of any other of the tests of the Bureau of Vocational Guidance. If one also takes into account the variation in the time of performance, in so far as to arrange all identical accuracy scores in the order of their rank in time, the test has a high positive correlation with the native ability of the Bedford 88, as estimated by the Director of the industrial school of the Reformatory after she had worked with this group of women for from eighteen months to two years. This correlation is $r = +.79$, P.E. = .026.

The name of each subject was written on a separate card. These were given to Miss Murphy, the Director, so arranged that rather more of the intelligent than of the unintelligent came first. To let the division of groups begin at the top and work down we hoped would check the error that might arise from a habit we have in the institution of giving the dull individuals the benefit of all doubt. That the cards were arranged in this way, Miss Murphy of course, was not aware; neither did she know what tests we had given this group nor that we wished the list for purposes of correlation. She was told merely that there were a series of girls of whom we wished her estimate and was asked to divide them into four groups according to native intelligence, as based on the relative fitness each had displayed to profit by the opportunity for training offered by the institution. We suggested that she think of them in terms of the effort required, provided each had received the same training previous to commitment to Bedford, to give each the minimum of schooling and industrial training sufficient to prepare them for parole. We suggested that she might consider also, which ones, other things being equal, would make the best use of this training during parole and thereafter. We were interested to note that she did not divide them into four equal groups. We had intended that the four groups should be separated by the median and the 25th and 75th percentiles. But it was not her habit to consider the inmates statistically, and we were glad, after all, that she made her divisions on the basis of those used in the school classification—good, fair, poor and too-stupid-to-learn. The result was a small group which she called the best, two slightly larger groups of equal numbers whom she said were fair and dull respectively, and a large group—about one-third of the total—whom she said ranged from *very* dull to feeble-minded. Her classification of them into natural, qualitative groups thus was

really a bimodal distribution, like that of the curves for the Bedford 88 in this and the other tests. After this classification had been made, we asked that the individuals in each group be arranged in the order of their individual merits.

Since Miss Murphy has entire charge, not only of the teaching but also of the placing of the women in the institution, we felt that her estimate of these subjects would be the most reliable measure we could obtain of their native intelligence, their relative industrial efficiency, and their capacity to learn. Some she had placed in the "book school"—grammar-school classes—, others in cooking, sewing, waitress and model classes; others were assigned to the farm to do out-door work, others to the kitchens of the various cottages as cooks and waitresses. One was appointed assistant to the book-keeper, another errand girl in the office, still others to weigh and divide supplies in the store room, etc. All were usually put in school for some portion of their time. To divide and subdivide the population successfully, so as to let the necessary work of the institution go on smoothly and at the same time to give each individual a maximum of the sort of training she most needs, presupposes considerable understanding of the inmates and of their needs and possibilities.

That a test which can be given in five or ten minutes to an inmate during the first two weeks of her sojourn in the Reformatory will correlate so uniformly with her proved capacity at the end of eighteen months in the institution is a definite and hopeful step toward indicating the usefulness of a clearance house for the sifting of women convicted of crime before their sentence is decided upon.

This correlation, + .79, is high as it stands, and there are several factors which could easily be controlled another time that would make it probably as high as + .90. For one thing, about a tenth of the Bedford 88 had not come under Miss Murphy's direct supervision and these had to be judged indirectly from matrons' reports. There were two who were pronounced insane shortly after entrance and transferred, and another who was discharged early, before any institution officer felt sure of an opinion of her. It is the differences in rank accorded to these ten which are responsible for some of the largest variations from the rank of the test. These could be avoided if it were known from the first that an estimate of all the girls would later be required. Then, there are at least two factors in the method of scoring the test where a modification would make its diagnosis of the inmates more reliable. These are: (1) the redistribution, under standardized conditions, of the per cent. of credit to be given each word—a device whereby more credit would be given to the more difficult opposites and

TABLE 44.

RANK OF 20 EASY OPPOSITES IN ORDER OF DIFFICULTY FOR BEDFORD 88 AND COLLEGE MAIDS.

| Stimulus | Bedford 88 | | | Stimulus | College Maids | | |
|---|---|---|---|---|---|---|---|
| | Rank | Failures | Errors | | Rank | Failures | Errors |
| Similar | 1. | 82.9 | 6.8 | Similar | 1. | 55. | 16.5 |
| Peace | 2. | 68.2 | 13.6 | Peace | 2. | 50. | 11.1 |
| Prompt | 3. | 67.0 | 11.4 | Prompt | 3. | 49.5 | 0. |
| Rapid | 4. | 53.4 | 0. | False | 4. | 38.5 | 5.5 |
| False | 5. | 48.9 | 5.7 | Rapid | 5. | 33.0 | 5.5 |
| Few | 6. | 38.6 | 10.2 | Soft | 6. | 27.5 | 5.5 |
| Narrow | 8. | 34.1 | 0. | Enemy | 7. | 27.5 | 0. |
| Enemy | 8. | 34.1 | 0. | Sorry | 8. | 22. | 0. |
| Sorry | 8. | 34.1 | 0. | Tall | 9. | 16.5 | 22. |
| Rough | 10. | 31.8 | 11.4 | Evening | 10.5 | 16.5 | 5.5 |
| Stout | 11. | 31.8 | 0. | Narrow | 10.5 | 16.5 | 5.5 |
| Evening | 12. | 28.4 | 12.5 | Few | 12.5 | 16.5 | 0. |
| Soft | 13. | 23.9 | 7.9 | Rough | 12.5 | 16.5 | 0. |
| Sick | 14. | 23.9 | 2.3 | Stout | 14.5 | 11.0 | 0. |
| Black | 15. | 20.5 | 0. | Good | 14.5 | 11.0 | 0. |
| Tall | 16. | 19.3 | 21.6 | Inside | 16. | 5.5 | 5.6 |
| Big | 18. | 17.0 | 1.1 | Sick | 18. | 5.5 | 0. |
| Poor | 18. | 17.0 | 1.1 | Poor | 18. | 5.5 | 0. |
| Good | 18. | 17.0 | 1.1 | Black | 18. | 5.5 | 0. |
| Inside | 20. | 13.6 | 4.5 | Big | 20. | 0. | 0. |

TABLE 45.

NUMBER AND PER CENT. OF WRONG* RESPONSES TO 20 EASY OPPOSITES AMONG THE SEVERAL REFORMATORY GROUPS.

| Stimulus | VIII Grade | | VII Grade | | VI Grade | | V Grade | | Below-Grade Group | | Bedford 88 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | Failures | | Errors | |
| Inside | | | 0 (1) | | 0 (1) | | | | 12 (2) | 35.3 | 12 | 13.6 | 4 | 4.5 |
| Tall | | | 1 (4) | 6.2 | 2 (7) | 12.5 | 1 (4) | 11.1 | 13 (4) | 38.2 | 17 | 19.3 | 19 | 21.6 |
| Enemy | | | 3 | 18.7 | 4 | 25.0 | 3 | 33.3 | 20 | 58.8 | 30 | 34.1 | | |
| Big | | | | | 1 | 6.2 | 2 | 22.2 | 12 (1) | 35.3 | 15 | 17.0 | 1 | 1.1 |
| Good | | | 1 (1) | 6.2 | | | 1 | 11.1 | 13 | 38.2 | 15 | 17.0 | 1 | 1.1 |
| Sorry | 1 | 7.7 | 2 | 12.5 | 4 | 25.0 | 4 | 44.4 | 19 | 55.9 | 30 | 34.1 | | |
| Sick | | | 2 (1) | 12.5 | 3 | 18.7 | 3 (1) | 33.3 | 13 | 38.2 | 21 | 23.9 | 2 | 2.3 |
| Poor | | | | | 2 | 12.5 | 1 (1) | 11.1 | 12 | 35.3 | 15 | 17.0 | 1 | 1.1 |
| Similar | 6 (3) | 46.1 | 12 (1) | 75.0 | 16 | 100.0 | 7 | 77.8 | 32 (2) | 94.1 | 73 | 82.9 | 6 | 6.8 |
| False | 0 (3) | | 4 | 25.0 | 11 | 68.7 | 5 (1) | 55.5 | 23 (1) | 67.6 | 43 | 48.9 | 5 | 5.7 |
| Prompt | 4 (3) | 30.8 | 6 (3) | 37.5 | 12 (2) | 75.0 | 6 (1) | 66.7 | 31 (1) | 91.2 | 59 | 67.0 | 10 | 11.4 |
| Black | | | | | 3 | 18.7 | 1 | 11.1 | 14 | 41.2 | 18 | 20.5 | | |
| Soft | 1 (2) | 7.7 | 3 (1) | 18.7 | 2 | 12.5 | 1 (1) | 11.1 | 14 (3) | 41.2 | 21 | 23.9 | 7 | 7.9 |
| Rough | 1 (4) | 7.7 | 3 (3) | 18.7 | 3 | 18.7 | 4 | 44.4 | 17 (3) | 50.0 | 28 | 31.8 | 10 | 11.4 |
| Narrow | 1 | 7.7 | 1 | 6.2 | 5 | 31.2 | 3 | 33.3 | 20 | 58.8 | 30 | 34.1 | | |
| Evening | 1 (2) | 7.7 | 2 (2) | 12.5 | 2 (1) | 12.5 | 2 (1) | 22.2 | 18 (5) | 52.9 | 25 | 28.4 | 11 | 12.5 |
| Stout | 1 | 7.7 | 2 | 12.5 | 4 | 25.0 | 3 | 33.3 | 18 | 52.9 | 28 | 31.8 | | |
| Rapid | 2 | 15.4 | 3 | 18.7 | 7 | 43.7 | 6 | 66.7 | 29 | 85.3 | 47 | 53.4 | | |
| Peace | 5 (2) | 38.5 | 10 (1) | 62.5 | 11 (4) | 68.7 | 6 (1) | 66.7 | 28 (4) | 82.3 | 60 | 68.2 | 12 | 13.6 |
| Few | 4 | 30.8 | 3 (3) | 18.7 | 4 (1) | 25.0 | 5 (1) | 55.5 | 18 (4) | 52.9 | 34 | 38.6 | 9 | 10.2 |

*The numbers in parentheses represent the number of errors.

less to the easier ones, and (2) a better method of estimating the actual time consumed in securing any given number of correct associations.

An obvious thing about this list is the unequal difficulty of its several words, at least for such groups as the Bedford 88 and College Maids. Table 44 gives the twenty words in the order of their difficulty as signified by the total per cent. who fail to give the correct response to each. It seems as though more than an equal amount of credit ought to be given for writing the opposite of "similar" than for the opposite of "inside." There is, moreover, a direct correlation between diminishing intelligence as measured by school grade and per cent. who fail to find the opposite of any given word. (See Table 45.)

A few words of greater difficulty among a series of less difficult ones has the advantage of not presenting too completely discouraging a list. The establishment of a standard list made up of groups of words of varying difficulty which would measure ability of widely disparate orders would be exceedingly useful for clinical purposes.

The time element is somewhat complicated by the fact that a careless individual will not stop to think about a word that presents the least difficulty, while the painstaking individual with more stable attention and better powers of concentration may spend the full allowance of thirty seconds on each difficult word. This is as it should be when she succeeds in finding the right opposite, but too frequently she only effects an increased time score. At best the gain of 5 per cent. accuracy does not seem to compensate the loss of thirty seconds of time. This might be equalized by adding thirty seconds for every word omitted were it not that it would penalize wrongfully those instances when a word is straightway left by a more intelligent girl, who realizes at a glance that she does not know its meaning and so passes on. It is not always possible to tell whether the rapid passing over of words is due to carelessness or due to a quick and sure sense of what one doesn't know. To add thirty seconds would be to obscure the differences between these latter and the girl who does not recognize when she does not know a word, who stupidly sits and stares at it until told to

go on. The writer is inclined to believe that the best adjustment of these time scores would be to record the time spent upon each word that is omitted and subtract it from the total time. The time would then be actually commensurate with the accuracy.

In any case, as it stands, this test of ability to give the opposites to a printed list of twenty words bids fair to have value in diagnosis as a basis for estimating the degree of an individual's native intelligence. In fact, with respect to immediate usefulness and practical significance one of the most important outcomes of this investigation is the high correlation between the control of these simple logical associations and the institution's estimation of relative efficiency at the end of the training period and at the time for parole.

## CHAPTER IV.

### Tests Continued

It seems best at this point to interrupt the comparison of the Reformatory women with the working girls in order to present a number of tests, not in the series of the Bureau of Vocational Guidance. These additional tests establish norms for the Bedford 88 in several important characteristics—facility and quality of reading and hand-writing, ability to follow easy and hard drections, intelligent vs. haphazard or blind methods of solving aiproblem, etc. The time of the College Maids which was at our disposal was limited but norms were determined for them in as many of these tests as was possible. The chapter may be omitted without disturbing the continuity of the rest of the study.

Some of these tests are those of the Juvenile Psychopathic Institute of Chicago. Their extensive use by Healy and their standardization for normal children by his former assistant, Dr. Clara Schmitt, furnish norms in terms of which the criminal woman may be compared with the recidivists of the Juvenile Court and with the pupils in the first six grades in "a certain large private school.....attended by children from unusually intelligent families."

Most of these tests were carried over from a series previously given to the 200 women mentioned above, to whom the Binet tests had been given. This was done chiefly to make certain that the 88 women, in terms of whom we were comparing the criminal woman with the working girl, were a representative group: it seemed safe to assume that if the distribution, norms and range of their scores were like those of the Binet 200 in a number of fundamental respects, their norms in the tests of the Bureau of Vocational Guidance would not differ materially from those of a much larger series of inmates.

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[1] Healy, Wm., *The Individual Delinquent;* Little, Brown & Co., 1915, p. 106.

*Section I. Facility and Character of Handwriting.*

Inasmuch as it was important to have some fixed measure of the handwriting of the Bedford 88, one of the tests chosen as a basis for the comparison of them with the Binet 200 was that of the rapidity and the quality of their handwriting. Each of the latter had been requested to write from dictation the phrase "The pretty little girl." This phrase was selected, not because of its merit as a writing test, but because it was in use at Vineland as a rough measure of the ability of the feeble-minded to write, with whom we had thought in the beginning to compare the writing of the Binet 200. The phrase is short, but has served the purpose of measuring handwriting better than might be expected.

The directions were: "Please write for me here—pointing to a place on the back of one of the unruled record cards—'The pretty little girl,' 'The—pretty—little—girl', "If the subject said "I can't spell" or "I can't write very well," we said, "That's all right, just do the best you can." If she asked how to spell "pretty" or "little" or "girl," we said: "Do the best you can with it yourself and I'll tell you about it afterwards." The time was taken from the instant the pen touched the paper until the last word was completed. It was so uncertain whether the subject was going to put a period after the phrase or not that time was recorded the moment the last word was finished. The test was given before any of those in which the subject was asked to work rapidly and the watch was not in evidence; the phrase was thus written at a "natural" rate.

The samples of writing of the Bedford 88 and the College Maids have been graded by the Thorndike measuring scale[1] of handwriting. The writing of the Reformatory women so little resembled the samples of Thorndike's adult scale that his scale for children from grades 5 to 8 was taken as the standard. The College Maids' writing was graded by the children's scale for purposes of comparison, although they wrote more like the samples of the adult scale. The samples of the Bedford 88

[1] Thorndike, Edward L.: *Handwriting*, Teachers College, Columbia University, 1912.

were also graded by the Ayres' scale[1] to compare them with the Binet 200 who had been checked in terms of the latter scale. Ayres' scale is also based, it will be recalled, on the writing of children in the "upper grammar grades." These scales permit us to compare the records of the Reformatory women from a new angle with those of pupils in the 5th to 8th grades.

*Results*: The surface of frequency of the distribution of the Bedford 88 and the Binet 200 among the various degrees of legibility of the Ayres' scale are nearly coincident (see columns 1 and 2, Table 46). The percentiles are identical (see Table 47). The smaller group of 88, apparently, is as typical of the criminal woman as is the larger group, so far as the measurement of the legibility of their handwriting is concerned.

The quality of the handwriting of the Binet 200, as measured by the Ayres' scale, has been analyzed into groups of the different mental ages (Table 48). The mental ages of the Binet 200 were obtained by the use of the Goddard 1911 adaptation of the Binet tests.

They were originally calculated before the more recent changes in the marking of some of the tests had been indicated by the Vineland Laboratory. Though we have since changed the Binet ages in accordance with the revised method it does not seem worth while to re-edit those tables which had already been compiled in terms of the old distribution. The two distributions of the 200 subjects among the Binet ages according to the earlier and the later marking differ only slightly with respect to the total number at each age.

| Mental Age | *Original Marking.* Distribution of Subjects | *Final Marking* Distribution of Subjects |
|---|---|---|
| 12 | 1 | 0 |
| 11 | 48 | 54 |
| 10 | 74 | 70 |
| 9 | 47 | 47 |
| 8 | 13 | 12 |
| 7 | 15 | 15 |
| 6 | 2 | 2 |

The percentiles for rapidity, legibility and quality of the writing of the Reformatory groups and of the College Maids are given in Table 47.

[1] Ayres, L. P. *A Scale for Measuring the Quality of Handwriting of School Children.* New York, Russell Sage Foundation, 1912.

TABLE 46.*

DISTRIBUTION OF THE BINET 200 AND THE BEDFORD 88 AND SUB-GROUPS WITH RESPECT TO THE LEGIBILITY OF THEIR HANDWRITING AS MEASURED BY THE AYRES' SCALE.

| Scale | Binet 200 | | Bedford 88 | | Grade Group | | Below-Grade Group | |
|---|---|---|---|---|---|---|---|---|
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| Failure | 14 | 7.0 | 8 | 9.1† | 0 | 0.0 | 8 | 23.5 |
| 20— | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 20 | 12 | 6.0 | 7 | 8.0 | 0 | 0.0 | 7 | 20.6 |
| 30 | 13 | 6.5 | 6 | 6.8 | 1 | 1.8 | 5 | 14.7 |
| 40 | 37 | 18.5 | 21 | 23.8 | 14 | 26.8 | 7 | 20.6 |
| 50 | 61 | 30.5 | 24 | 27.2 | 19 | 35.2 | 5 | 14.7 |
| 60 | 43 | 21.5 | 18 | 20.4 | 16 | 29.0 | 2 | 5.9 |
| 70 | 10 | 5.0 | 3 | 3.4 | 3 | 5.5 | 0 | 0.0 |
| 80 | 9 | 4.5 | 1 | 1.1 | 1 | 1.8 | 0 | 0.0 |
| 90 | 1 | 0.5 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Total | 200 | | 88 | | 54 | | 34 | |

* These estimated qualities of writing represent the average judgment of three competent judges.

† In the Binet series when the subject could not write from dictation, we let her copy "The little Paul" and graded her writing on this phrase. This, unfortunately, was not done for the Bedford 88, so naturally those who could not write from dictation are included in the failure group, despite the fact that those with legitimate language handicaps had already been excluded from the Bedford 88.

TABLE 47.

PERCENTILES OF THE HANDWRITING OF THE BINET 200, THE BEDFORD 88 AND SUB-GROUPS AND COLLEGE MAIDS.

| | Group | 25th | Median | 75th | Limits | |
|---|---|---|---|---|---|---|
| | | | | | Upper | Lower |
| Ayres' Scale | Binet 200 | 60 | 50 | 40 | 90 | Failure |
| | Bedford 88 | 60 | 50 | 40 | 80 | Failure |
| | Grade Group | 60 | 50 | 40 | 80 | 30 |
| | Below-Grade Group | 50 | 30 | 20 | 60 | Failure |
| Thorndike's Scale | Bedford 88 | 13 | 11 | 9 | 16 | Failure |
| | Grade Group | 13 | 12 | 11 | 16 | 9 |
| | Below-Grade Group | 11 | 9–8 | 6 | 14 | Failure |
| | College Maids | 14 | 12 | 12 | 15 | 10 |
| Time of writing phrase in seconds | Bedford 88 | 11 | 14.8 | 19.3 | 7 | 72.4* |
| | College Maids | 9 | 12.6 | 14.2 | 7 | 19 |

*es.

TABLE 48.

THE DISTRIBUTION OF THE VARIOUS MENTAL AGES OF THE BINET 200 WITH RESPECT TO THE LEGIBILITY OF THEIR HANDWRITING.

| Scale | 11 yrs. | 10 yrs. | 9 yrs. | 8 yrs. | 7 yrs. | 6 yrs. |
|---|---|---|---|---|---|---|
| Failure | 0 | 0 | 1 | 2 | 7 | 0 |
| 20— | 0 | 0 | 0 | 1 | 3 | 0 |
| 20 | 0 | 1 | 6 | 1 | 4 | 0 |
| 30 | 1 | 2 | 9 | 1 | 0 | 0 |
| 40 | 2 | 18 | 10 | 4 | 1 | 2 |
| 50 | 22 | 25 | 12 | 2 | 0 | 0 |
| 60 | 15 | 20 | 7 | 1 | 0 | 0 |
| 70 | 5 | 3 | 2 | 0 | 0 | 0 |
| 80 | 8 | 1 | 0 | 0 | 0 | 0 |
| 90 | 1 | 0 | 0 | 0 | 0 | 0 |
| Total | 54 | 70 | 47 | 12 | 15 | 2 |

Seventy-five per cent. of the Bedford 88 write this phrase of 19 letters at least as rapidly as 1 letter per second. (See original scores, p. 45.) Thorndike finds rapidity "in itself" to be a good sign. Certainly, slowness proves a bad sign, since the slowest quarter of the Bedford 88 includes only one specimen better than Sample 9, one-third of those who write as poorly as 9, and all but one of those who write less well than this.

There is very little difference in legibility, according to Thorndike, above Quality 11. Sixty-two and five-tenths per cent. of the Bedford 88 and 85 per cent. of the College Maids write as well as this or better, and at a rate not slower than 1 letter per second. Forty-seven and seven-tenths per cent. of the former and 80 per cent. of the latter write as rapidly as this and at least as well as Quality 12, which Thorndike characterizes as "a good plain hand" entirely adequate "for writing cash checks, simple book entries, labels and the like."[3] Twenty-eight and four-tenths per cent. of the Bedford 88 and 45 per cent. of the College Maids write as well as Quality 13, at a rate of 1 letter per second—a point at which Thorndike would advise the transfer of a child in the grades to training in typewriting.

As in the tests of the Bureau of Vocational Guidance, so here in quality of writing, there is a close correspondence between the records of the Reformatory women of the Grade Group and the

[3] *Op. cit.*, p. 37.

records of the children actually in those grades from which our Grade Group left school. The median for the Grade Group is Quality 12, which we estimate from the data Thorndike gives on page 30, is the median for his 7th and 8th grades. The rate at which this group of our subjects write is also comparable to that of Thorndike's children in corresponding grades. Thorndike states that Quality 7 is nearly the worst of the 5th grade samples and Quality 17 nearly the best writing of the 8th grade. The poorest quality for the Grade Group is 7, the best 16.

The Below-Grade Group is, as usual, distinctly inferior. Their median quality is 8.5, their median time one-half second per letter slower than that of the Grade Group. Moreover, of the above mentioned 47.7 per cent. who write "entirely adequately," 85 per cent. are of the Grade Group, only 15 per cent. of the Below-Grade Group. Or, stated in terms of the two groups themselves, 66 per cent. of the Grade Group but only 17.6 per cent. of the Below-Grade Group write well enough and with facility enough to be good cash girls. Of the remaining third of the Grade Group only 5.4 per cent. write more slowly than 1 letter per second. Of the Below-Grade Group 50 per cent. either write more slowly than this or cannot write at all. With respect to the quality of their writing, measured by the Thorndike scale, none of the Grade Group write as poorly as the poorer 50 per cent. of the Below-Grade Group, and only 13 per cent. of the former fall within the range of the poorest 73.5 per cent. of the latter. Besides not overlapping at the poor end, only 5 per cent. of the Below-Grade Group come within the range of the best 41.6 per cent. of the Grade Group (Table 49). It is interesting to note in the light of recent comparisons of the two scales that these per cents are about the same for the degree of overlaping of the two groups when measured by the Ayres' scale (Table 46). In terms of the latter none of the Grade Group write as poorly as the poorest 44.1 per cent. of the Below-Grade Group, and only 1.8 per cent. of them fall within the range of the poorest 58.8 per cent. of the latter. Besides not overlapping at the poor end, only 5.9 per cent. of the Below-Grade Group by this scale, too, overlap the better 36.3 per cent. of the Grade Group.

TABLE 49.

DISTRIBUTION OF BEDFORD 88 AND SUB-GROUPS, AND COLLEGE MAIDS WITH RESPECT TO THE QUALITY OF THEIR HANDWRITING AS MEASURED BY THE THORNDIKE SCALE.*

| Quality | College Maids | | Bedford 88 | | Grade Group | | Below-Grade Group | |
|---|---|---|---|---|---|---|---|---|
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| Failure | | | 8 | 9.1 | | | 8 | 23.5 |
| 4 | | | 0 | 0.0 | | | 0 | 0.0 |
| 5 | | | 0 | 0.0 | | | 0 | 0.0 |
| 6 | | | 2 | 2.3 | | | 2 | 5.9 |
| 7 | | | 3 | 3.4 | | | 3 | 8.8 |
| 8 | | | 4 | 4.5 | | | 4 | 11.8 |
| 9 | | | 15 | 17.0 | 7 | 13.0 | 8 | 23.5 |
| 10 | 3 | 15.0 | 1 | 1.1 | 1 | 1.8 | 0 | 0.0 |
| 11 | 1 | 5.0 | 13 | 14.8 | 10 | 18.5 | 3 | 8.8 |
| 12 | 7 | 35.0 | 17 | 19.3 | 13 | 24.1 | 4 | 11.8 |
| 13 | 4 | 20.0 | 11 | 12.5 | 10 | 18.5 | 1 | 2.9 |
| 14 | 2 | 10.0 | 6 | 6.8 | 5 | 9.3 | 1 | 2.9 |
| 15 | 3 | 15.0 | 7 | 8.0 | 7 | 13.0 | 0 | 0.0 |
| 16 | 0 | 0.0 | 1 | 1.1 | 1 | 1.8 | 0 | 0.0 |
| Totals | 20 | | 88 | | 54 | | 34 | |

* These estimated qualities of writing represent the average judgment of three competent judges.

The poorer character of the writing of the Below-Grade Group must be explained more largely in terms of unequal ability, or incentive to learn, etc., than as a result of unequal opportunity. They attended school almost as many years as the Grade Group and the percentiles of the number of years of retardation which stand to their credit best tells of their failure to profit by their training.

| | 25th | Median | 75th |
|---|---|---|---|
| Below-Grade Group..... ..... | 3½ | 5 | 7 |
| Grade Group..... | 0 | 1 | 2 |

Moreover, their rank in writing, as measured at entrance, correlates + .70, P. E. .039, with their rank in native intelligence estimated after eighteen months of individual drill in the industrial and grammar school of the Reformatory. In this rating of their native intelligence, facility in reading and writing did not count for more than their share. Corrections were made for

those who had had limited opportunity to learn before coming to Bedford, and more weight was given to the ability to learn which each displayed in the institution school .than to actual attainment at entrance. As the school principal arranged the women in order of merit, she said: "This girl has good native ability, she is making excellent progress in school. She is ignorant and untrained and could not read or write at entrance, but she didn't have the chance to learn which most of the others had when she was younger. I've put her among the best in native ability." In a number of instances she rated low a woman who could read and write well because "she is dull, not only in 'book school,' but is stupid and inefficient in industrial classes as well." On such a basis of ranking there could not be so high a co-efficient as + .70 if many of those who wrote well at entrance had proved otherwise dull or if more than a few of those who could not write at entrance had proved themselves among the best in learning ability. Of course, it must be remembered that the 12 per cent. with language handicaps had already been eliminated from the 100 to whom the Bedford 88 belong.

As bearing upon the question of what part skill in writing plays in ranking in the opposites test, the fact that the correlation between opposites and writing is less than between opposites and native ability is worth noting.

| | | |
|---|---|---|
| Writing and native ability..... | $r = +.70$, | P. E. .039 |
| Writing and opposites accuracy..... | $r = +.63$, | P. E. .046 |
| Opposites and native ability..... | $r = +.79$ | |

*Section 2. Rapidity and Character of Reading.*

The passage selected as a test for ability to read, like the writing test, was carried over from the series of tests given to the Binet 200. Choice, again, had fallen originally upon a passage in use at Vineland to admit if desired, a comparison of the reading ability of the criminal woman with that of the feeble-minded.

NEW YORK | JUNE 5.

A *big flood* | at *Cape May* | *last week* | *swept away* | five | boats | full | of fish |. A *little boy* |, the son | of a fisherman |, was carried out | to sea |.

*While trying* | to save | him | a man | in a *row boat* | was washed | overboard | and *nearly drowned* |. The child| was saved|.[1]

Memory for isolated ideas was estimated by giving a credit of 4 per cent. to each of the unit ideas (separated by bars above) which was recalled. A value of 2 per cent. or half-credit, was given when only one of the italicized words within a bar was recalled. Unessential words, if omitted, involved no loss.

The directions were: "Please read this aloud for me." The time required for reading the passage was recorded, but not to the subject's knowledge. When the reading was concluded, the subject was asked, without warning, to recall what she could: "Tell me all you can remember of what you just read. What was it about?" The reply was taken down verbatim. When the subject had finished with a free recital, unless she had recalled all of the unit ideas, we said: "Are you sure that's all? Think again and maybe you will think of something else." If she said: "I can't," we replied: "Oh try! You may surprise yourself and remember several more things."

*Results*: (1) In Table 50 Columns 1 and 2 point to a close correspondence between the Bedford 88 and the Binet 200 in rapidity of reading. Upon the whole the Bedford 88 read a little better than the Binet 200, but this is probably accounted for by the omission from their ranks of all those who could have read better in their own language than in English and of all those who had not been in America long enough to learn to read English. So, as with ability to write, it seems that in ability to read the Bedford 88 differ little from the range and distribution of the scores of the longer series of 200 and may be considered to be as representative of the criminal woman, accordingly, as a group three times its size. The percentiles for the character of their reading are identical for the two groups (Table 51).

(2) With respect to the criminal woman's ability to read, on the basis of the Bedford 88, we may safely assume that 71.5 per cent. read at least "satisfactorily," *i. e.*, are able to pronounce correctly all the words of a passage no more difficult than the

[1]Henry H. Goddard, The Binet-Simon Measuring Scale for Intelligence, *The Training School*, 1911, p. 16.

TABLE 50.

DISTRIBUTION OF BINET 200, BEDFORD 88 AND SUB-GROUPS WITH RESPECT TO TIME REQUIRED TO READ STANDARD PASSAGE.

| Time Sec. | Binet 200 | | Bedford 88 | | Grade Group | | Below-Grade Group | |
|---|---|---|---|---|---|---|---|---|
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| 9–10 | 13 | 6.5 | 6 | 6.8 | 6 | 11.1 | 0 | 0.0 |
| 11–12 | 28 | 14.0 | 18 | 20.5 | 16 | 29.6 | 2 | 5.9 |
| 13–14 | 39 | 19.5 | 13 | 14.8 | 12 | 22.2 | 1 | 2.9 |
| 15–16 | 48 | 24.0 | 17 | 19.3 | 11 | 20.4 | 6 | 17.7 |
| 17–18 | 9 | 4.5 | 3 | 3.4 | 3 | 5.6 | 0 | 0.0 |
| 18+ | 63 | 31.5 | 31 | 35.2 | 6 | 11.1 | 25 | 73.5 |
| Totals | 200 | | 88 | | 54 | | 34 | |
| Those over 18 seconds analyzed further: | | | | | | | | |
| 19–31 | 16 | 8.0 | 10 | 11.4 | 5 | 9.3 | 6 | 17.6 |
| 32–44 | 10 | 5.0 | 3 | 3.4 | | | 2 | 5.9 |
| 45–57 | 5 | 2.5 | 3 | 3.4 | | | 3 | 8.8 |
| 58–70 | 2 | 1.0 | 1 | 1.1 | | | 1 | 2.9 |
| 70+ | 5 | 2.5 | 3 | 3.4 | 1 | 1.9 | 2 | 5.9 |
| Few words only | 8 | 4.0 | 2 | 2.3 | | | 2 | 5.9 |
| Own lang. only | 0 | 0.0 | 2 | 2.3 | | | 2 | 5.9 |
| Can't read | 17 | 8.5 | 7 | 8.0 | | | 7 | 20.6 |
| Totals | 63 | | 31 | | 6 | | 25 | |

TABLE 51.

PERCENTILES FOR READING OF BINET 200, BEDFORD 88 AND SUB-GROUPS AND COLLEGE MAIDS.

| | Group | 25th | Median | 75th |
|---|---|---|---|---|
| Reading time in sec. | Binet 200 | 13–14 | 15–16 | 19–31 |
| | Bedford 88 | 11–12 | 15–16 | 19–31 |
| | Grade Group | 11–12 | 13–14 | 15–16 |
| | Below-Grade Group | 15–16 | 32–44 | A little in own lang. only |
| | College Maids | 11 | 14 | 16 |
| Character of reading | Binet 200 | Well | Correct | Poor |
| | Bedford 88 | Well | Correct | Poor |
| | Grade Group | Well | Correct | Correct |
| | Below-Grade Group | Fair | Poor | A little in own lang. only |
| | College Maids | Well | Correct | Correct |
| Per cent. recalled of passage read | Binet 200 | 44 | 32 | 24 (Limits 76— 0) |
| | Bedford 88 | 44 | 32 | 22 (Limits 72— 0) |
| | Grade Group | 44 | 36 | 28 (Limits 72—12) |
| | Below-Grade Group | 32 | 25 | 0 (Limits 68— 0) |
| | College Maids | | No data | |
| | 20 Woman Students Normal College* | 56 | 50 | 36 (Limits 72—24) |

*These Normal College women would score still better than the Reformatory women if the thought of the passage as a whole were measured instead of the detached unit ideas.

above and will omit nothing. Fifteen and nine-tenths per cent. read poorly, stumble, hesitate and struggle with the passage as a small child would, while 12.6 per cent. are unable to read in any language or read only an occasional word in their own language. Many of those who cannot read at all have been too dull to learn even their letters (Table 52). Their ability to comprehend the meaning of the words they can pronounce is another matter. The direction tests reported in the following section indicate that both the Grade Group and the Below-Grade Group comprehend much less rapidly than they are able to read the text.

With respect to the rapidity with which the passage can be read, it seems that 61.4 per cent. complete the reading in 16 seconds. The writer can read it in a comfortable, leisurely fashion in 14 seconds. Certainly a normal adult ought to read it in 17.[2] The Maids read it in 11, 14 and 16 seconds, respectively, at the 25th, Median and 75th percentiles.

(3) Both in quality and time the Grade Group read better than the Below-Grade Group. Of the former, 83 per cent. read either well or excellently, while only 23.5 per cent. of the Below-Grade Group are this successful. In time all but 16.7 per cent. of the Grade Group read the passage in 16 seconds or less, whereas 73.5 per cent. of the Below-Grade Group require longer than 18 seconds to read it. Certainly the Below-Grade Group is less able to read simple, easy prose at a standard rate with reasonable success than is the Grade Group. As in writing this does not mean, however, that lack of opportunity for schooling is the main cause of their poorer success for 41.2 per cent. of them went to school until they were fourteen, all but 35 per cent. until they were at least thirteen and the 75th percentile individual until she was eleven, long enough, manifestly, to learn to read if she had kept up to grade. It is undoubtedly true that some of the increased time of the Below-Grade Group

[2]The percentiles for the reading of this passage by a group of twenty woman students in a normal college were 13–15.3 and 17 seconds respectively. The average was 15.1 seconds and the limits 10.2 and 19.2, respectively. Some, however, read for dramatic effect, so that these figures do not represent natural rates.

over the Grade Group in the opposites test, direction test, etc., is due to less facility in reading, but in the light of their school retardation, and of the fact that about the same percentage of them are slower also in sorting cards in doing puzzles and performing other tests in which reading plays no part, this limitation in reading appears to be only another phase of the general slowness and inefficiency of this group.

(4) The correlation between the rate of reading and the native ability of our subjects as judged by the principal of the institution industrial school is $r = + .67$, P. E. = .042.

(5) For any who may be interested the distribution of the groups of different mental ages of the Binet 200 is given with respect to the rapidity with which the passage is read (Table 53).

(6) Aside from the fact that so many of the Reformatory women read the passage with ease (71.5 per cent. at least "satisfactory," 61.4 per cent. in 16 seconds or less), the most important result of this test is the fact that they apprehend so little of what they read. Further tests on this point are necessary and are in progress. Their account of the passage is fragmentary, and not exact. If the same facts are told to them, on the other hand, they give a more accurate and complete account of the flood, the boats of fish, the child who was in danger, etc. After reading the passage the 25th percentile individual recalls only 44 per cent. of the unit ideas into which it has been divided, the median only 32 per cent. and the 75th only 22 to 24 per cent. (Table 51). We quote below a number of these accounts selected at random from the Bedford 88. We have punctuated them to imitate as well as possible their recital.

Subject 7 reads "well" in 15.6 secs. "On June 5th there was a great flood at Cape May and the fisherman was drowned I guess. Well anyway a man in a rowboat and he saved the little child. Something was washed away.

Subject 66 reads "well" in 12.2 secs. "A flood and a fisherman's son was drowned and a fisherman went to save him and a boat was thrown overboard. The fisherman was drowned—the child was saved."

Subject 26 reads "well" in 9.4 secs. "A little child went out in a boat and a man was washed overboard. She was a pretty little child that went out to sea."

Subject 85 reads "nicely" in 15.8 secs. "Something about a ship. A child was saved, the man was overboard. Something about fish, ain't it? Cape May."

Subject 9 reads "fairly" in 15.8 secs. "Probably the little boy was fishing and fell overboard and so probably a fisherman came along and saved him. The child was 5 years of age. It happened in New York June 5th."

TABLE 52.

ESTIMATED READING ABILITY OF BEDFORD 88 AND SUB-GROUPS.

| Group | VIII Grade | | VII Grade | | VI Grade | | V Grade | | Grade Group | | Below-Grade Group | | Bedford 88 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| Well* | 5 | 38.5 | 8 | 50 | 5 | 31.3 | 2 | 22.2 | 20 | 37.0 | 2 | 5.9 | 22 | 25.0 |
| Correct* | 7 | 53.8 | 7 | 43.8 | 9 | 56.3 | 2 | 22.2 | 25 | 46.3 | 6 | 17.6 | 31 | 35.2 |
| Fair* | 0 | 0.0 | 1 | 6.3 | 2 | 12.5 | 2 | 22.2 | 5 | 9.3 | 5 | 14.7 | 10 | 11.3 |
| Poor Careless Stumbling | 1 | 7.7 | 0 | 0.0 | 0 | 0.0 | 3 | 33.3 | 4 | 7.4 | 10 | 29.4 | 14 | 15.9 |
| A few words in English | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 2 | 5.9 | 2 | 2.3 |
| A little in own language | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 2 | 5.9 | 2 | 2.3 |
| Can't read in any language | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 7 | 20.6 | 7 | 8.0 |
| Total | 13 | | 16 | | 16 | | 9 | | 54 | | 34 | | 88 | |

* "Well" = with expression, good enunciation and observation of punctuation.
"Correct" = Mechanically correct, but without very much expression.
"Fair" = Childishly, but not carelessly and no stumbling.

TABLE 53.

THE DISTRIBUTION OF THE VARIOUS MENTAL AGES OF THE BINET 200 WITH RESPECT TO TIME IN READING.

| Time in Sec. | 11 yrs. | 10 yrs. | 9 yrs. | 8 yrs. | 7 yrs. | 6 yrs. |
|---|---|---|---|---|---|---|
| 9–10 | 7 | 5 | 1 | 0 | 0 | 0 |
| 11–12 | 12 | 8 | 8 | 0 | 0 | 0 |
| 13–14 | 20 | 16 | 3 | 0 | 0 | 0 |
| 15–16 | 14 | 31 | 3 | 0 | 0 | 0 |
| 17–18 | 0 | 5 | 4 | 0 | 0 | 0 |
| 18+ | 1 | 5 | 28 | 12 | 15 | 2 |
| Totals | 54 | 70 | 47 | 12 | 15 | 2 |
| Those over 18 seconds analyzed further: | | | | | | |
| 19–31 | 0 | 0 | 12 | 3 | 1 | 0 |
| 32–44 | 0 | 2 | 7 | 1 | 0 | 0 |
| 45–57 | 1 | 1 | 2 | 0 | 1 | 0 |
| 58–70 | 0 | 0 | 1 | 1 | 0 | 0 |
| 70+ | 0 | 2 | 3 | 0 | 0 | 0 |
| Only few words | 0 | 0 | 2 | 3 | 3 | 0 |
| In own language | 0 | 0 | 0 | 0 | 0 | 0 |
| Can't read | 0 | 0 | 1 | 4 | 10 | 2 |

Subject 15 reads "well" in 11.6 secs. "Something about a boat was drowned at sea. The man was drowned and the child was saved. Cape May last week."

### *Section 3. Directions Tests.*

Some reliable measure of ability to comprehend and follow directions is important for clinical and institutional purposes. Especially useful from the immediate practical side would be tests through which one could ascertain, if only roughly, an individual's ability to understand and carry out the instructions of the average employer under whom she will have to serve her parole and earn her livelihood. Such tests might serve also to supplement present a priori and inductive efforts to couch the directions of our several tests in such terms as to insure an equal understanding of their performance on the part of all subjects. Such an equal understanding is, of course, essential if the time and errors involved in its performance are to be taken as an exact measure of the specific mental characteristic one desires to gauge and shall not include time consumed or errors made in grasping directions and technique.

Although the literature descriptive of the defective and delinquent makes constant use of such terms as "unalertness," "lack of comprehension," "slowness of apperception," and the like, there is little experimental data in the field of mental tests establishing norms or defining individual differences in ability to comprehend directions. This section represents at least a step toward the establishment of such measurements for the criminal woman. The standard directions tests of Woodworth and Wells[1] seemed the natural ones with which to begin. Accordingly, so far as these tests admit, we have aimed (1) to gain some line on the complexity of the directions which the Reformatory women are able to follow, (2) to estimate the range of individual differences among these subjects, as indicated by differences in accuracy and rapidity of their responses, and (3) to calculate how closely these individual differences correlate with relative capacities to profit by the training of the institution.

[1] *Op. cit.*, pp. 70 and 72.

Two sets of verbal directions were devised by the writer. These also have been given to the Reformatory subjects but the results are not yet ready for publication. It may be affirmed, however, that they bid fair to be useful. They serve to indicate that the Reformatory woman can follow verbal instruction somewhat more successfully than those she is required to read. They serve also to isolate with considerable finality those who are slow to comprehend simple, every-day directions.

(1) A doll's bed, some three feet long, and a supply of bedding were put on a table. The directions were: "Pretend I am the lady of the house. I will tell you how I wish this bed made and then I am going over to my desk to work. When you have finished call me and we will see how well you have been able to do what you were told. Now, listen carefully! Make the bed as well as you can. Make it so that when I go to bed my head will be at the foot, for you see I don't like the light from that window shining in my eyes. Use the yellow, not the white, mattress pad. Use the plain, not the initialed, sheets, and put on only one quilt." The women like this test and think it great fun.

(2) Ten white metal, half-inch to three-quarter-inch high objects, a rooster, engine, monkey, chair, cup, camel, shoe, street car, dog and hat, were put on a table. The writer's attention was directed to these little objects as good material for tests by Dr. Ellis of the Neurological Institute of New York City, who was using them in a memory test. We tried roughly to let the directions range in difficulty from the simplest sort, *i. e.*, "turn the hat upside down," to one which demanded a choice of reaction, which choice in turn depended upon some discrimination of the material at hand. Before the test began the objects were arranged in a procession facing to the subject's left in the order designated rooster, engine, monkey, chair, pitcher, camel, shoe, car, dog and hat. The subject was told that it was a test to show how quickly and well she could follow directions, could do what she was told, that each direction would be repeated only once and she must listen very carefully. She was told that she must wait until we said *ready* each time before doing what was asked. To illustrate the procedure, the two following directions were given.

1. Put the shoe on the chair. Ready!
2. Tell me what object comes after the street car, and then tell me what one is just in front of it. Ready!

The watch is started with the ready signal and stopped when the subject has finished each reaction. We also timed the test as a whole, but if only one stop watch is available, the former is a more significant measure to retain. Care was taken to speak very distinctly and at a fairly slow rate.

Directions:

1. How many objects are there in the procession?
2. How many animals are there?
3. Name an animal that isn't there.
4. Turn the hat upside down.
5. If the rooster is green, put it at the other end of the procession behind the hat, but if it is yellow, hand it to me. (If the subject fails to set the rooster down behind the hat the experimenter must do so before the 6th direction is given.)
6. Name every other object.
7. With your left hand, pick up the first three objects on the left, and with

your right hand, the last four objects on the right.

8. Hand me all together the things you picked up with your left hand, and then hand me, one at a time, those you picked up with your right hand.

(After this direction the cup, the camel and the shoe should be on the table in the order designated from left to right.)

9. Which of these three objects is the smallest?

10. Put the shoe between the camel and the cup.

11. Give a wrong answer to the question! What three objects are there on the table?

12. Put anything you like beside the cup, something green beside the shoe, and an animal beside the camel.

13. Change the position of three of these objects, but do not move the shoe or the camel.

14. As I call the names of the different objects, you set them in a procession facing the left as they were in the beginning.

15. If the camel is bigger than the dog, give me a red object, but if the dog is bigger, give me the hat.

16. Name as many objects as the rooster and the monkey together have feet.

17. Put the animals in a row facing yourself.

18. Set the things to wear beside each other.

19. Make a procession of all the objects and this time be sure that the green ones follow each other and that all the animals come one behind the other.

20. When I pick up one object you pick up two and when I pick up two you pick up one. (The experimenter picks up first one, then two and then one.)

The first Woodworth and Wells direction test is known as the Easy Directions Test and is made up as follows:

Cross out the smallest dot • • •

Put a comma between these two letters: G H

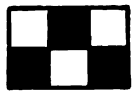
How many ears has a cat?

Make a line across this line: |

Show by a cross which costs more: a hat or an orange.

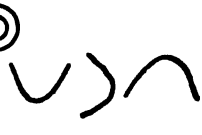
Write 8 at the thinnest part of this line: ——

Write any word of three letters.

Put a dot in one of the white squares: 

Cross out the word you know best: fish, brol, matzig.

Leave this just as it is:

Mark the line that looks most like a hill: 

How many t's are there in twist?

Dot the line that has no dot over it:

Write o after the largest number: 3 86 12

Mark the name of a large city: London, painter.

Make a letter Z out of this:

Join these two lines: —— ——

Write s in the middle square:

Write any number smaller than 10.

Put a question mark after this sentence

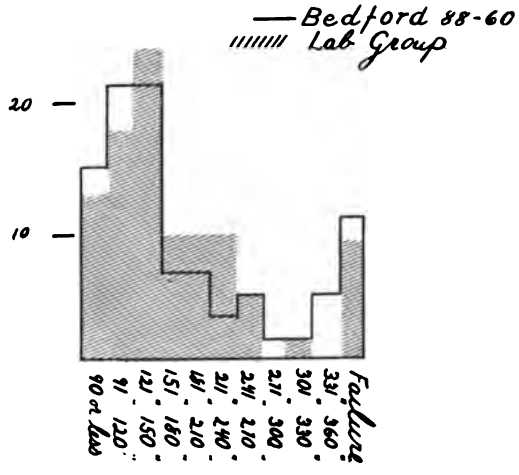
This easy directions test was given before the hard one. The instructions were: "I have a paper here on which there is a list of things for you to do. It will help me to tell how good a worker you are, how quickly and well you can do what you are told. Take your pencil and when I put the paper down on the table, do just what it tells you to do. If it says 'Make a crooked line' you make a crooked line; no matter *what* it tells you to do, even though it seems foolish to you, do it exactly, and see how quickly you can finish the test. Take all the time you need to do just what it says, but don't waste a single minute. Ready, go!"

As for the method of scoring, 5 per cent. was given for each direction exactly followed. Unless what was called for was literally done, no credit was given, except in the 5th and 18th directions, where if an "8" instead of an "s" was put in the middle square, or if it was somehow indicated that a hat costs more than an orange, though not by a cross, 2.5 per cent. was given. Time was recorded for the total test.

This test was given, with the few exceptions noted below, to the first 68 of the Bedford 88. Three of the 68 were transferred or taken out on a writ before their turn to be tested, and 5 were unintentionally omitted. We have, thus, records for an unselected 60 of the Bedford 88, to whom we shall refer as the "Bedford 88–60." In addition to this group the test was given to a later series of 100 inmates, tested as they came to the Reformatory from the courts. Of these, 25 were colored women. Their records have been tabulated separately and are referred to as the "Colored Group." Of the other 75, 5 were taken out on writs before the test could be given, and as in the case of the Bedford 88, 8 records were omitted from the tabulations because the subjects were foreign and much better able to do the tests in their own language than in English. There remain 62 white girls to be tabulated of the 75, to whom we shall refer as the "Lab. Group." Thus the easy directions test was given to 25 colored girls and to 122 white girls, of whom 60 belong to the Bedford 88 and 62 to the Lab. Group. To these 122 we shall refer as the "Total 122."

*Results:* Curve 92 makes graphic how closely the records of the Bedford 88–60 parallel those of the Lab. Group. (See also

Tables 57 and 59.) Their records in this test coincide as closely with those of the Lab. Group as they did with the Binet 200 in the foregoing tests. Had all three groups, the Bedford 88, the Binet 200, and the Lab. Group been given this easy directions test, the range, percentiles, etc., would have differed little from these which have been determined from the smaller group above.




CURVE 93.—Surface of frequency of Time Records of Lab. group and Bedford 88-60. Easy Direction Test of Woodworth and Wells.

According to Woodworth & Wells, these directions were made "as concise as possible in order that the reading time might not be a determining factor." With our subjects there is inevitably a difference in reading time from subject to subject, which conciseness can minimize, but not obliterate. The page of directions is approximately three times the length of the standard passage used in the reading test. Estimating on the basis of the percentiles of the latter, the best quarter of our subjects should read these directions "well" in not over 40 secs., the median subject "satisfactorily" in not over 50 sec., and the 75th percentile subject, with help, in not over 90 sec. If the Reformatory women comprehended as they read, *i. e.*, as they pronounced the text, the percentiles for the time required to complete the test ought to be but slightly longer than those of the reading time. As a matter of fact, the time per-

centiles, without regard to accuracy scores, are over twice as long as those of the reading time. They are approximately 100, 130, and 230 sec., respectively, at the 25th, median, and 75th percentiles; and a majority of the subjects were not able to comprehend without actually reading the directions through at least twice. The College Maids, too, in proportion to their rate of reading, were slow to appreciate what they must do. They required 76.4, 110.6, and 150.6 sec. at the three percentiles to complete the test.

The average time required by Woodworth and Wells' "educated adult" subjects is 3.6 sec. per reaction, or 72 sec. for the whole, with limiting records of 46 and 114 sec. Only 3 of the Total 122 Reformatory women and only 4 of the College Maids are as quick as this average. The average time for the Total 122 (not including the 13 total failures, whose time scores were indeterminate) was 151.9 sec., with limiting records of 55 to 397.4 sec.

If one calculates an index of the time it takes to get 100 per cent. correct (time divided by accuracy, multiplied by 100) the percentiles are 104, 156.9, and 379 sec. for the Bedford 88–60, and 78.3, 130.1, and 188.2 sec. for the College Maids. (Indexes were not calculated for the Total 122 or the Lab. Group.) These indexes are, of course, ideal standards of accuracy which some of our subjects could not attain under any circumstances, but they serve well as a combined measure of time and accuracy. Upon this basis, to secure 100 per cent. it would take the Reformatory women 25.7, 26.8, and 191 sec. longer at the three percentiles, respectively, than the College Maids to follow the directions accurately.

The Bedford 88–60 approximate the scores of the College Maids and of Woodworth and Wells' subjects—among which latter errors are negligible—more nearly in the accuracy of their scores than in the time it takes to accomplish them. The actual percentiles of accuracy, without regard to time, are 97.5, 90, and 80 per cent. for the College Maids, 95, 90, and 75 per cent. for the Total 122, and 95, 90, and 70 per cent. for the Bedford 88-60. These scores seem good until one considers how very simple the directions are and how much time has been consumed in the effort to comprehend and perform them.

TABLE 54.

PERCENTILES IN EASY DIRECTION TEST FOR COLLEGE MAIDS. TOTAL 122, BEDFORD 88–60, AND COLORED GROUP. SHOWING ACCURACY IN PER CENT., TIME AND INDEX IN SECONDS.

| | | 25th Percentile | Median | 75th Percentile | Limits | | |
|---|---|---|---|---|---|---|---|
| | | | | | Upper | Lower | |
| College Maids | Accuracy | 97.5 | 90. | 75. | 100. | 65. | (no failures) |
| | Time | 76.4 | 110.6 | 150.6 | 57.2 | 283.8 | (no failures) |
| | Index | 78.3 | 130.1 | 188.2 | 57.2 | 366.1 | (no failures) |
| Total 122 | Accuracy | 95 | 90. | 75. | 100. | ? | (13 failures) |
| | Time (approx.) | 100.0 | 130.0 | 230.0 | 55.0 | 397.4 | (13 failures) |
| | Index | | No Index | figured | | | |
| Bedford 88–60 | Accuracy | 95. | 90. | 70.0 | 100. | 35. | ( 7 failures) |
| | Time | 98.0 | 142.0 | 235.0 | 70.0 | 397.4 | ( 7 failures) |
| | Index | 104.0 | 156.9 | 379.0 | 73.6 | 690.2 | ( 7 failures) |
| Colored Group | Accuracy | 92.5 | 85. | 70. | 97.5 | 62.5 | ( 3 failures) |
| | Time | 168.0 | 232.9 | 389.0 | 89.2 | 797.0 | ( 3 failures) |
| | Index | 176.8 | 278.7 | 580.8 | 101.9 | 1099.3 | ( 3 failures) |

The average, the distribution and the range of time scores for the Total 122, as divided into four groups by the 25th, the median, and the 75th percentile records of accuracy are given in Table 55. There is a genuine correlation between time and accuracy. Of those who vary from 72.5 to 0 per cent. in accuracy there are only 3.3 per cent. who attain or surpass the median time score of those whose scores range from 90 to 100 per cent., and only 12 per cent. of those with an accuracy from 87.5 to 75 per cent. overlap the latter.

TABLE 55.

AVERAGE AND DISTRIBUTION OF THE TIME SCORES, IN SECONDS, OF THOSE OF THE TOTAL 122 WHOSE RECORDS IN ACCURACY RANGES (1) FROM 100% THROUGH 95%, (2) FROM 92.5% THROUGH 90%, (3) FROM 87.5% THROUGH 75%, AND FROM 72.5% THROUGH 0%.*

| Time in Sec. | 100—95% | | 92.5—90% | | 87.5—75% | | 72.5—0% | |
|---|---|---|---|---|---|---|---|---|
| Average† | 121.6 | | 119.4 | | 180.8 | | 232.1 | |
| Range | 55–200 | | 72.5–224 | | 78.6–340.6 | | 108–397.4 | |
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| 90 or less | 11 | 24.4 | 4 | 18.2 | 2 | 8.0 | 0 | 0.0 |
| 91–120 | 12 | 26.7 | 10 | 45.5 | 1 | 4.0 | 1 | 3.3 |
| 121–150 | 14 | 31.1 | 4 | 18.2 | 8 | 32.0 | 2 | 6.7 |
| 151–180 | 6 | 13.3 | 1 | 4.5 | 2 | 8.0 | 1 | 3.3 |
| 181–210 | 2 | 4.4 | 2 | 9.1 | 3 | 12.0 | 3 | 10.0 |
| 211–240 | 0 | 0.0 | 1 | 4.5 | 5 | 20.0 | 2 | 6.7 |
| 241–270 | 0 | 0.0 | 0 | 0.0 | 2 | 8.0 | 4 | 13.3 |
| 271–300 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1 | 3.3 |
| 301–330 | 0 | 0.0 | 0 | 0.0 | 1 | 4.0 | 1 | 3.3 |
| 331–360 | 0 | 0.0 | 0 | 0.0 | 1 | 4.0 | 2 | 6.7 |
| Failure | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 13 | 43.3 |
| Total | 45 | | 22 | | 25 | | 30 | |

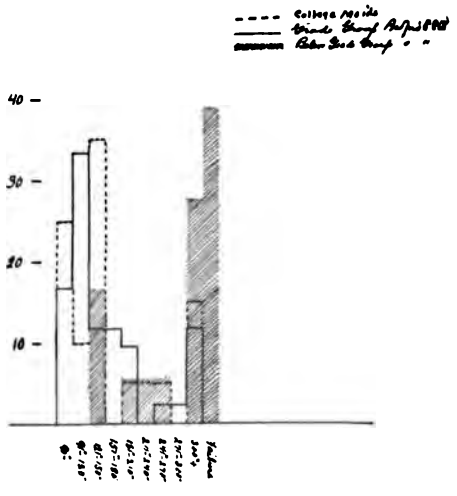
*95%, 90%, and 75% are the 25th, the median and the 75th percentiles of accuracy for the Total 122.

†Average time for total 122 is 151.9 sec. (13 failures omitted from calculation). Range 55 to 397.4 sec.

The small group of colored women is poorer on the whole than the white girls and just a trifle better than the Below-Grade Group. (For their percentiles see Table 54.) Yet, we may state dogmatically that they do better in the test in pro-

portion to their opportunities for learning to read than do the white girls.

The Grade Group is decidedly superior to the Below-Grade Group, especially with respect to index scores. (See Curve 94 and Tables 57, 58 and 59.) Woodworth writes that this and the hard list have been given to children in the various grades, but that the scores are not yet tabulated.




CURVE 94.—Surface of Frequency of Index Scores.
Easy direction Test of Woodworth and Wells.

The 20 easy directions were chosen by Woodworth and Wells to be about equal in difficulty, at least for their subjects. For our group, however, they vary from the least difficult, "How many ears has a cat," which 14 of the Total 122 were unable to achieve, to "Show by a cross which costs more, a hat or an orange," which 62 failed to comprehend. The College Maids, also, found four of the directions decidedly less easy than the others. The 20 directions are arranged in the order of their difficulty for our subjects in Table 56, where the easiest one is given a rank of one.

The greater difficulty of a number of these directions is inherent in the text of the directions themselves, as the analysis of responses indicates, but for the most part the inequalities reflect the varying intelligence of the subjects themselves. To secure what Woodworth and Wells intended this test to measure, *i. e.*, individual differences in *rate of comprehending* directions, all of which are perfectly easy to understand, another and easier set would have to be devised for the Reformatory women. Meantime, the directions as they stand (if the time consumed and the errors made may be taken to indicate, for all subjects alike, actual differences in the mental characteristics under investigation) serve to indicate roughly how simply the instructions of employers must be worded to be effective, and how primer-like the directions of our mental tests.

Had these 20 directions been equally easy for all the Reformatory women, individual differences, in all probability, would have been less marked and the coefficient of correlation between rank in index scores in the test and rank in native intelligence would have been not so high as it is. This correlation is + .76, P.E. .038. The coefficient between native intelligence and accuracy scores is somewhat less, + .62, P.E. .056. It follows that the test as it stands is of considerable importance as indicative of general intelligence and as prophetic of industrial efficiency when measured by capacity to profit by the training of the Reformatory.

It is interesting that the correlation between the accuracy scores in this easy directions test and the accuracy scores of the easy opposites test is + .72, P.E. .074. This is a genuine correlation between ability to comprehend simple directions and to control simple logical associations by opposites, not a correlation between ability to comprehend the directions of the directions test proper on the one hand and capacity to comprehend the requirements of the opposites test on the other. At least, we feel confident that each subject was made to understand to the full extent of her ability, what was meant by an opposite and exactly what was expected of her in the test. The two tests undoubtedly have in common the discrepancy between the relative rapidity with which material can be read

and the slowness with which its meanings are comprehended. How far the latter is a measure of mental defect, of absolute incapacity to comprehend quickly, and how far it is a consequence of bad reading habits which more modern methods of training could eradicate, is a problem we have not tried to solve.

*Analysis of the responses of the total 122 to the 20 easy directions.*

1. In response to "Cross out the smallest dot." 9 crossed out some other dot than the smallest or crossed out all three. Another 13—all low-grade feeble-minded individuals—failed to make any response at all either to this or to any of the other directions.[1]

2. "Put a comma between these two letters," precipitated 26 wrong responses. Seventeen of these responses were among the best 75 per cent. in total accuracy scores. The wrong responses were sometimes the result of missing the qualification *between* and putting the comma in the wrong place; others said they did not know what a comma was.

3. "How many ears has a cat?" Aside from the 13 feeble-minded, who failed to answer all the other directions too, only 1 subject was baffled by this question; which goes to show that, if the content of the direction is simple enough, it can not only be read, but can also be comprehended and followed by a large majority of the total 122.

4. "Make a line across this line." Of the 8 who gave wrong responses to this direction none failed to make a mark. The difficulty was that they missed the adverbial qualification *across* and drew the line either above or below or parallel to the original line.

5. "Show by a cross which costs more: a hat or an orange." Of the 49 wrong responses to this direction 33 were by subjects among the best 75 per cent. in total accuracy scores. Only 7 of the 33 failed to indicate in some manner, though not by a cross, that the hat costs more, and these 7 said that they did not understand "about the cross and the hat." Of the 16 who belong to the poorest quarter in accuracy scores, 10 missed the idea of the cross, but indicated that the hat cost more; the other 6 made no response. Forty per cent. of the College Maids were unable to understand this direction as it stands. It was the cross that puzzled them too. Had the direction read "Which costs more: a hat or an orange?" only 13 of the Reformatory women over and above the 13 who failed in all the other tests as well, would have been unable to follow the directions. It was instructive and amusing to watch them puzzle over what a cross had to do with the cost of a hat or an orange. "A hat costs more," they would say, "but what about the cross?" It will be recalled that we gave half-credit for the omission of the cross.

6. "Write '8' at the thinnest part of this line." All but 3 of the 13 inaccurate responses to this direction were among the poorest quarter of the accuracy scores. Of the 13, 3 wrote nothing, 2 made a mark instead of the

[1] To avoid repetition of this phrase, the 13 who failed in all 20 of the directions will not be included in the number of wrong responses analyzed. These must be added to the number above in each case to obtain the total number of wrong responses given in Table 59. This 13, obviously, belong to the poorest quarter of the Total 122, which quarter is responsible for the great majority of the incorrect responses.

## TABLE 56.

RANK IN ORDER OF DIFFICULTY OF THE TWENTY EASY DIRECTIONS, TOGETHER WITH THE NUMBER AND PER CENT. OF THE TOTAL 122 OF THE COLLEGE MAIDS AND OF THE COLORED GROUP WHO FAIL IN EACH.

| Direction | Total 122 | | | College Maids | | | Colored Group | | |
|---|---|---|---|---|---|---|---|---|---|
| | Rank | No. | Per Cent. | Rank | No. | Per Cent. | Rank | No. | Per Cent. |
| How many ears has a cat? | 1 | 14* | 11.5 | 3.5 | 0 | 0. | 3.5 | 3 | 12 |
| Write any number less than ten. | 2 | 15 | 12.3 | 3.5 | 0 | 0. | 7.5 | 4 | 16 |
| Leave this just as it is: | 3 | 16 | 13.1 | 3.5 | 0 | 0. | 3.5 | 3 | 12 |
| Join these two lines: | 4 | 17 | 13.9 | 3.5 | 0 | 0. | 3.5 | 3 | 12 |
| Dot the line that has no dot over it: | 5.5 | 18 | 14.8 | 8.0 | 1 | 5. | 3.5 | 3 | 12 |
| Put a dot in one of the white squares: | 5.5 | 18 | 14.8 | 3.5 | 0 | 0. | 3.5 | 3 | 12 |
| Make a line across this line: | 7 | 21 | 17.2 | 8.0 | 1 | 5. | 7.5 | 4 | 16 |
| Cross out the smallest dot: | 8 | 22 | 18.0 | 15.0 | 3 | 15. | 11.5 | 7 | 28 |
| Make a letter Z out of this: | 9 | 23 | 18.8 | 8.0 | 1 | 5. | 3.5 | 3 | 12 |
| Put a question mark after this sentence. | 10 | 24 | 19.7 | 11.5 | 2 | 10. | 11.5 | 7 | 28 |
| Cross out the word you know best: | 11.5 | 26 | 21.3 | 11.5 | 2 | 10. | 11.5 | 7 | 28 |
| Write 8 at the thinnest part of this line: | 11.5 | 26 | 21.3 | 11.5 | 2 | 10. | 15.0 | 9 | 36 |
| Write s in the middle square: | 13 | 31 | 25.4 | 15.0 | 3 | 15. | 9.0 | 5 | 20 |
| Mark the line that looks most like a hill: | 14 | 32 | 26.2 | 11.5 | 2 | 10. | 14.0 | 8 | 32 |
| Write any word of three letters. | 15 | 34 | 27.9 | 3.5 | 0 | 0. | 16.0 | 10 | 40 |
| How many t's are there in twist? | 16 | 38 | 31.2 | 15.0 | 3 | 15. | 11.5 | 7 | 28 |
| Put a comma between these two letters: | 17 | 39 | 32.0 | 18.0 | 7 | 35. | 18.0 | 13 | 52 |
| Mark the name of a large city: | 18 | 49 | 40.2 | 17.0 | 5 | 25. | 17.0 | 11 | 44 |
| Write o after the largest number: | 19 | 57 | 46.7 | 20.0 | 10 | 50. | 19.0 | 14 | 56 |
| Show by a cross which costs more: | 20 | 62 | 50.8 | 19.0 | 8 | 40. | 20.0 | 18 | 72 |

* 13 low-grade feeble-minded women were unable to carry out any of the 20 directions properly. If these are subtracted the other 109 are not so different from the College Maids in accuracy.

figure 8, and 3 put the number at the thickest instead of the thinnest part of the line.

7. "Write any word of three letters." Of the 21 wrong responses, 11 were among the better three-quarters in accuracy scores. Four wrote 3 words (one group was "cat, Atlantic, girl"), 5 wrote 3 letters ("BPR," etc.), 1 read the direction aloud twice as follows: "Write any of these three letters," shook her head and went on to the next, 1 wrote "little," 1 "girl," 1 "three," 1 "letters," 1 "a", 1 "apple," and 5 made no response.

Of the 88 who wrote a word of three letters, 28 wrote "cat," 9 "dog," 9 "the," 4 "rat," 4 "yes," 3 "one," 3 "eat," 3 "any," 3 "two," 2 "you," 2 "and," 2 "let," and 2 "see." The following words were written by but one individual: "God," "fur," "dry," "get," few," "lie," "sum," "out," "are," "oak," "mat," "man," "big," and "pan."

8. "Put a dot in one of the white squares." Three put a dot in each square, 1 a dot outside the figure and 1 an "x" in the middle square.

9. "Cross out the word you know best." Three crossed out "matzig," 3 did nothing, 3 crossed out a word in the sentence, 3 crossed out the word "brol," and 1 both "fish" and "matzig." The latter said that the word "matzig" was a Jewish word for a kind of bread.

10. "Leave this just as it is." The 3 who failed in this all belonged to the poorest quarter of the subjects with respect to accuracy. One joined the two figures, 1 put a line under the arrow, and 1 put another circle around the circle with the dot in it.

11. "Mark the line that looks most like a hill." Seven marked the wrong line, 7 made a slanting line, 3 copied the line that looked like a hill and 2 did nothing. A chief source of difficulty here was reading the word "mark" as "make."

12. "How many t's are there in twist?" To this question there were 25 wrong responses, of which 13 were among the poorest quarter of the group in accuracy scores. Eight wrote "1," 3 wrote "3," 1 wrote "5," 1 wrote "none," 4 said "I don't know what that means," 7 did nothing, and 1 wrote "A branch" and when questioned afterwards, re-read it and said "A grig" (meaning twig) "is a branch, isn't it?" The expression "t's" is too technical for them. They can't pronounce it and do not understand it. The point at which this expression becomes unintelligible seems to be the same point which determines that the subject will not be able to answer accurately more than 72.5 per cent. of the whole test. Very few, however, would be so poor that they could not count the number of t's in twist if they only understood the expression. Of the 8 who wrote "1," all explained afterwards that there was only one *ts* in the word.

13. "Dot the line that has no dot over it." Two crossed out the first of the three lines, and 3 put a cross over the first one.

14. "Put O after the largest number." To this there were 44 inaccurate responses, of which 33 put the zero *over* instead of *after*, the largest number. Moreover, 25 of these errors were made by the better three quarters of the subjects. If one reads this direction, especially if one's auditory-verbal imagery is strong the sound of the *zero* or the sound of the "O" if one pronounces it as a letter seems to dominate over the first syllable of *after* and produces what is almost an illusion of "zero over." There were 13 errors where the zero was written either after a smaller number or omitted, or one of the numbers was crossed out. These latter were, of course, genuine errors. Eight of the 11 colored girls who failed in this direction and 4 of the 10 College Maids who failed put the zero over the 86. The writer suggests that the text of this direction be changed to read: "Put the number 1 after the largest number." or "Put O over the largest number."

15. "Mark the name of a large city." To this, 5 said "I don't know what that means," 11 did nothing, 1 gave an incoherent response, and the other

19 read "mark" as "make," and 12 of them wrote "New York," 2 "Paris," 1 "Philadelphia," 1 "England," 1 "Italy," 1 "Ohio," and 1 "Raphael."

16. "Make a letter Z out of this." One did nothing, 1 made an 8 out of the figure, and 1 wrote "alphabet," 7 made a Z to one side.

17. "Join these two lines." Two did nothing, 1 made a copy of the two lines unjoined to one side, and 1 underlined the first line.

18. "Write s in the middle square." To this direction there were 18 wrong responses. Three wrote "8" instead of "s" in the middle square. These women were all near-sighted and were given 2.5 per cent. credit. One wrote s in the first square, 1 wrote s in all three squares, 1 wrote "square" in the middle square, 1 wrote "square" in the first square, 1 wrote "the" in the first square, 1 wrote "the" in the middle square, 1 wrote "1" in all three squares, 1 wrote "1st" in the middle square, 1 wrote "God" in the first square, 1 wrote "4" in the middle square, 1 wrote "nine" in the middle square, 1 wrote "1" in the first square, "2" in the second, and "3" in the third, 1 drew a line through all three squares, and 2 did nothing.

19. "Write any number smaller than 10." In response to this there were only two errors. One wrote "12," and 1 wrote "1" in a square of the preceding test.

20. "Put a question mark after this sentence." Two put a period, 2 a comma, 1 an exclamation point, 2 wrote questions, *viz.*, "How many hours in the day?" and "Can I have it?" and 4 did nothing. Evidently the failures here are largely the result of lack of knowledge about punctuation marks.

2. *The hard-directions test* is reproduced here with the addition of a number of vertical bars to serve as division marks and of Roman numerals to number these divisions for convenient reference.

With your pencil make a dot over any one of these letters F G H I J, (I) || and a comma after the longest of these three words: boy mother girl (II) || Then, if Christmas comes in March, make a cross right here.....(III) | but if not, pass along to the next question, and tell where the sun rises..... (IV) || If you believe that Edison discovered America, cross out what you just wrote, (V) | but if it was some one else, put in a number to complete this sentence: "A horse has....feet." (VI) || Write *yes*, no matter whether China is in Africa or not....; (VII) || and then give a wrong answer to this question: "How many days are there in the week?".....(VIII) || Write any letter except *g* just after this comma,....(IX) || and then write *no* if 2 times 5 are 10.....(X) || Now, if Tuesday comes after Monday, make two crosses here.....; (XI) | but if not, make a circle here.....or else a square here.....(XII) || Be sure to make three crosses between these two names of boys: George.....Henry. (XIII) || Notice these two numbers: 3, 5. If iron is heavier than water, write the larger number here.....,(XIV) | but if iron is lighter write the smaller number here.....(XV) || Show by a cross when the nights are longer: in summer?.....in winter?.....(XVI) || Give the correct answer to this question: "Does water run uphill?"..... (XVII) || and repeat your answer here.....(XVIII) || Do nothing here (5 + 7 = .....), unless you skipped the preceding question (XIX); || but write the first letter of your first name and the last letter of your last name at the ends of this line: (XX) ||

TABLE 57.

EASY-DIRECTIONS TEST, DISTRIBUTION OF TIME SCORES FOR COLLEGE MAIDS, TOTAL 122, LAB. GROUP, BEDFORD 88–60 AND SUB-GROUPS, AND COLORED GROUP.

| Time in Sec. | College Maids | | Total 122 | | Lab. Group | | Bedford 88–60 | | Grade Group | | Below-Grade Group | | Colored Group | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| 90 or less | 5 | 25 | 17 | 13.9 | 8 | 12.9 | 9 | 15.0 | 9 | 21.4 | 0 | 0.0 | 1 | 4. |
| 91–120 | 7 | 35 | 24 | 19.7 | 11 | 17.7 | 13 | 21.7 | 13 | 30.9 | 0 | 0.0 | 0 | 0. |
| 121–150 | 2 | 10 | 28 | 22.9 | 15 | 24.2 | 13 | 21.7 | 9 | 21.4 | 4 | 22.2 | 5 | 20. |
| 151–180 | 2 | 10 | 10 | 8.2 | 6 | 9.7 | 4 | 6.7 | 4 | 9.5 | 0 | 0.0 | 2 | 8. |
| 181–210 | 1 | 5 | 10 | 8.2 | 6 | 9.7 | 4 | 6.7 | 3 | 7.1 | 1 | 5.6 | 2 | 8. |
| 211–240 | 1 | 5 | 8 | 6.6 | 6 | 9.7 | 2 | 3.3 | 0 | 0.0 | 2 | 11.1 | 3 | 12. |
| 241–270 | 1 | 5 | 6 | 5.0 | 3 | 4.8 | 3 | 5.0 | 3 | 7.1 | 0 | 0.0 | 0 | 0. |
| 271–300 | 1 | 5 | 1 | 0.8 | 0 | 0.0 | 1 | 1.6 | 0 | 0.0 | 1 | 5.6 | 0 | 0. |
| 301–330 | 0 | 0 | 2 | 1.6 | 1 | 1.6 | 1 | 1.6 | 0 | 0.0 | 1 | 5.6 | 1 | 4. |
| 331–360 | 0 | 0 | 3 | 2.5 | 0 | 0.0 | 3 | 5.0 | 1 | 2.4 | 2 | 11.1 | 8 | 32. |
| Failure | 0 | 0 | 13 | 10.6 | 6 | 9.7 | 7 | 11.7 | 0 | 0.0 | 7 | 38.9 | 3 | 12. |
| Total | 20 | | 122 | | 62 | | 60 | | 42 | | 18 | | 25 | |

TABLE 58.

DISTRIBUTION OF INDEX SCORES OF COLLEGE MAIDS, BEDFORD 88–60 AND SUB-GROUPS, AND COLORED GROUP IN EASY-DIRECTIONS TEST.

| Index in Sec. | College Maids | | Bedford 88–60 | | Grade Group | | Below-Grade Group | | Colored Group | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| –75 | 4 | | 1 | | 1 | | 0 | | 0 | |
| 76–90 | 1 | 25. | 6 | 11.7 | 6 | 16.7 | 0 | 0. | 0 | 0. |
| 91–105 | 1 | | 9 | | 9 | | 0 | | 1 | |
| 106–120 | 1 | 10. | 5 | 23.3 | 5 | 33.3 | 0 | 0. | 0 | 4. |
| 121–135 | 4 | | 3 | | 3 | | 0 | | 0 | |
| 136–150 | 3 | 35. | 5 | 13.3 | 2 | 11.9 | 3 | 16.7 | 3 | 12. |
| 151–165 | 0 | | 4 | | 4 | | 0 | | 2 | |
| 166–180 | 0 | 0. | 1 | 8.3 | 1 | 11.9 | 0 | 0. | 1 | 12. |
| 181–195 | 1 | | 3 | | 3 | | 0 | | 0 | |
| 196–210 | 0 | 5. | 2 | 8.3 | 1 | 9.6 | 1 | 5.6 | 1 | 4. |
| 211–240 | 1 | 5. | 1 | 1.6 | 0 | 0. | 1 | 5.6 | 1 | 4. |
| 241–270 | 1 | 5. | 2 | 3.3 | 1 | 2.4 | 1 | 5.6 | 2 | 8. |
| 271–300 | 0 | 0. | 1 | 1.6 | 1 | 2.4 | 0 | 0. | 2 | 8. |
| 300 plus | 3 | 15. | 10 | 16.6 | 5 | 11.9 | 5 | 27.8 | 9 | 36. |
| Failure | 0 | 0. | 7 | 11.7 | 0 | 0. | 7 | 38.9 | 3 | 12. |
| Total | 20 | | 60 | | 42 | | 18 | | 25 | |

TABLE 59.

DISTRIBUTION OF ACCURACY SCORES FOR COLLEGE MAIDS, TOTAL 122, LAB. GROUP, BEDFORD 88–60 AND SUB-GROUPS, AND FOR COLORED GROUP IN EASY-DIRECTIONS TEST.

| Per Cent. Correct | College Maids | | Total 122 | | Lab. Group | | Bedford 88–60 | | Grade Group | | Below-Grade Group | | Colored Group | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| 100. | 4 | | 16 | | 7 | | 9 | | 8 | | 1 | | 0 | |
| 97.5 | 2 | | 4 | | 2 | | 2 | | 1 | | 1 | | 1 | |
| 95. | 2 | 40. | 25 | 36.9 | 13 | 35.5 | 12 | 38.3 | 11 | 47.6 | 1 | 16.7 | 4 | 20. |
| 92.5 | 0 | | 7 | | 3 | | 4 | | 4 | | 0 | | 2 | |
| 90. | 5 | 25. | 15 | 18.0 | 8 | 17.7 | 7 | 18.3 | 7 | 26.2 | 0 | 0.0 | 1 | 12. |
| 87.5 | 0 | | 3 | | 0 | | 3 | | 1 | | 2 | | 3 | |
| 85. | 1 | 5. | 4 | 5.7 | 3 | 4.8 | 1 | 6.6 | 1 | 4.8 | 0 | 11.2 | 2 | 20. |
| 82.5 | 0 | | 5 | | 5 | | 0 | | 0 | | 0 | | 0 | |
| 80. | 1 | 5. | 6 | 9.0 | 4 | 14.6 | 2 | 3.3 | 0 | 0.0 | 2 | 11.2 | 1 | 4. |
| 77.5 | 1 | | 4 | | 2 | | 2 | | 1 | | 1 | | 1 | |
| 75. | 2 | 15. | 3 | 5.7 | 2 | 6.4 | 1 | 4.9 | 1 | 4.8 | 0 | 5.6 | 1 | 8. |
| 72.5 | 0 | | 1 | | 0 | | 1 | | 1 | | 0 | | 1 | |
| 70. | 0 | 0. | 2 | 2.5 | 1 | 1.6 | 1 | 3.3 | 1 | 4.8 | 0 | 0.0 | 2 | 12. |
| 67.5 | 0 | | 3 | | 1 | | 2 | | 1 | | 1 | | 1 | |
| 65. | 2 | 10. | 0 | 2.5 | 0 | 1.6 | 0 | 3.3 | 0 | 2.4 | 0 | 5.6 | 0 | 4. |
| 62.5 | 0 | | 1 | | 1 | | 0 | | 0 | | 0 | | 2 | |
| 60. | 0 | 0. | 2 | 2.5 | 1 | 3.2 | 1 | 1.7 | 0 | 0.0 | 1 | 5.6 | 0 | 8. |
| 57.5 | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| 55. | 0 | 0. | 2 | 1.6 | 2 | 3.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0. |
| 52.5 | 0 | | 2 | | 0 | | 2 | | 2 | | 0 | | 0 | |
| 50. | 0 | 0. | 0 | 1.6 | 0 | 0.0 | 0 | 3.3 | 0 | 4.8 | 0 | 0.0 | 0 | 0. |
| 47.5 | 0 | | 3 | | 1 | | 2 | | 1 | | 1 | | 0 | |
| 45. | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| 42.5 | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| 40. | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| 37.5 | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| 35. | 0 | 0. | 1 | 3.3 | 0 | 1.6 | 1 | 4.9 | 1 | 4.8 | 0 | 5.6 | 0 | 0. |
| Failure | 0 | 0. | 13 | 10.6 | 6 | 9.7 | 7 | 11.7 | 0 | 0.0 | 7 | 38.9 | 3 | 12. |
| Total | 20 | | 122 | | 62 | | 60 | | 42 | | 18 | | 25 | |

The instructions for the harder test were: "This is another page of things for you to do. It is a little harder than the other, so watch carefully and no matter what it tells you to do, do it as well and as quickly as you can. As before, take all the time you need to get it right, but don't take a second longer than you need, for I want to see how quickly you can work. Ready,—go!"

With respect to the matter of scoring, the passage was divided as nearly as possible into twenty equal parts, which are indicated by the bars in the copy above. Of these twenty I, II, VII, IX, X, XIII, XVI, XVII, XVIII, and XX, are simple unqualified directions but little, if any, more complicated than those of the easy directions test. To this group of simple directions VIII and XIX may be added because their modifying clauses can so easily be disregarded by the subject without affecting the success of the response. III and IV, V and VI, XI and XII, XIV and XV, on the other hand, demand (1) a choice of two alternative reactions which depend upon ability to appreciate the force of a compound-complex sentence, and (2) a correct choice which depends upon knowing whether Christmas comes in March, whether Edison discovered America, whether Tuesday comes after Monday, and whether iron is heavier than water. As a direction test per se, or as a measure of ability to read complex sentences understandingly, the more important of these two phases of the response is the appreciation that a choice of reactions is to be made; the less important, whether it is made upon the correct or the wrong knowledge of the conditioning factors. To illustrate: 4 College Maids and 6 Reformatory subjects think that water is heavier than iron "because it holds ships up", and upon this basis proceed to omit the larger number from the first clause, and to put the smaller number in the second. If each half of these alternate directions be independently figured as a unit of $\frac{1}{20}$ of the test, such a subject, though she has made a choice of reactions, receives no credit for either half. In fact, she receives a lower score than one who missed the force of the complex sentence altogether and who stupidly left both parts blank or who filled in both parts, for marking each half alone would give 5 per cent.

credit to either of the two latter types of reaction. It seemed better to grade the two halves in terms of each other as parts of the whole situation, especially as Woodworth and Wells themselves state that the object of the hard directions test "is to complicate the directions somewhat, by calling for additional and alternative responses, etc." By the latter system if the subject proceeds on the basis that Christmas does not come in March, that Edison did not discover America, that Tuesday comes after Monday, or that iron is heavier than water, and makes her choice of reaction accordingly, she is given full credit for the two parts, or a total of 10 per cent. If, on the other hand, her choice of reaction is made as though Edison discovered America, or Tuesday comes before Monday, etc., she is given 5 per cent., because a choice of reaction is made, while the other 5 per cent. is withheld because it has been wrongly made. If, however, she fills in both parts or leaves both blank, no credit is given either half.

Another ambiguity encountered in marking the test and not so easily disposed of, is the difficulty of determining how much the success of stupid subjects who make an apparent discrimination of reactions is due to their ability to grasp the force of the interrelated parts of the sentence and how much it is merely the result of skipping the more difficult part of the direction and answering the more concrete command of the easier part. For instance, "If Christmas comes in March make a cross right here ....." puzzles the stupid girl. Presently she leaves this portion unanswered to read hurriedly through "but if," etc. When, however, she comes to "and tell where the sun rises ....." this makes sense to her and produces the relatively quick response: "The east." The only way to determine her mental processes is to ask the subject afterwards to explain her reaction, and this way is obviously unsatisfactory.

Our aim in scoring was to register as many degrees of ability to follow the more difficult directions as was possible. We soon noted that some of the directions, such as "Make three crosses between the names of these two boys," lent themselves to three grades of response, viz.: (1) complete failure, (2) missing part

of the idea, such as the number of crosses or the place they were to be put, but putting the wrong number in the *right* place or the *right* number in the wrong place, (3) completely correct response. To register these differences we gave 0 to the first type of response, 2.5 per cent. to the second, and 5 per cent., or full credit, to the third. Certain ones of the proposed half-credits, we found later, were so seldom called for that they might be dropped with no appreciable difference in the results. Others were so numerous and their distribution among the brighter subjects was such as to suggest the need for modification in the text of the directions themselves. The method we used is given in detail below. The use of half-credits worked out satisfactorily (see Table 60). Whereas the least accurate quarter made approximately 13 failures to 1 error, the most accurate quarter succeeded in getting almost 2 directions half-right to every 1 totally wrong. Although some were not keen enough to follow out the directions with entire correctness, they were not so dull as those who totally missed the point. Roughly the proportion of errors to failures are:

2 to 1 Best quarter in total accuracy scores. (23 Er. 13 Failures).
1 to 2 2nd best quarter (22 Er.—47 Failures).
1 to 3 3rd quarter (30 Er.—90 Failures).
1 to 13 Poorest quarter (16 Er.—215 Failures).
1 to 4 Total Bedford 88–60 (91 Er.—365 Failures).
1 to 2 College Maids (33 Er.—69 Failures).

This method gave a higher positive correlation with rank in native ability than any other scheme of grading which we tried. ($r = + .77$, P.E. = .037.)

*Method of Scoring:*

I. If a dot is put over one letter—5 per cent. credit. If a comma or some other mark than a dot is put over *one* letter—2.5 per cent. credit.

II. If entirely correct—5 per cent. credit. If some other punctuation mark than a comma is put *after the longest word*, or if a *comma* is put after some other word than mother—2.5 per cent. credit.

III and IV. If the first half is left blank and it is stated that the sun rises in the "east" or "at the horizon"—5 per cent. to both III and IV. If it states that the sun rises in the west, south, north or in the sky—a total of 7.5 per cent. credit. (*i. e.* 5 per cent. to III and 2.5 per cent. to IV). If it states *when* instead of *where* the sun rises, for instance, "in the morning,"—a total credit of 5 per cent. to III and IV (*i. e.*, 5 per cent. to III and 0 to IV). If the cross is put in the blank in III and IV is left unanswered—half-credit since the force of the alternative direction has been appreciated though the choice

has been made on the wrong basis. (In cases like the last as a matter of fact instead of marking both III and IV 2.5 per cent. we marked III 5 per cent. and IV 0 per cent. This gave a total of 5 per cent. to the two parts, but it shows such errors in Table 60 in the "all wrong" column instead of in the "partly wrong" column. It might have been better to have given the 2.5 per cent. to each part though the final result is the same.) If both halves are filled in, or both parts left unanswered—no credit to either alternate direction, since no choice was made.

V and VI. If what was just written is not crossed out and a number put in between "has" and "feet"—5 per cent. to both V and VI. If more or less feet than four are attributed to the horse—no deduction. If the sentence "The horse has....feet" is not understood to be "this sentence" because the force of the colon is not understood, and if in consequence the number is put just after the colon—5 per cent. to V and 2.5 per cent. to VI, whether or not a number is also put in to tell how many feet the horse has. If the force of the colon is not missed, but it is stated that the horse has *big* feet or *hard* feet instead of giving the number of feet—5 per cent. to V and 2.5 per cent. to VI. If "what you just wrote" is crossed out and VI left blank—2.5 per cent. to both V and VI, on the basis that the subject comprehended the force of the alternative direction and is merely mistaken regarding who discovered America. If both V and VI are left blank or both answered—no credit to alternate directions, since no choice was made.

VII. If "yes" is written—5 per cent. credit, otherwise none.

VIII. If some number other than 7 is written—5 per cent. credit, otherwise none.

IX. If a letter other than *g* is written after the comma—5 per cent. credit. If some number or word is written after the comma—2.5 per cent. credit, on the basis that to miss only "except *g*" is better than not to understand any of the direction at all.

X. If "no" is written—5 per cent. credit, otherwise none.

XI and XII. If two crosses are put in XI and neither a circle nor a square in XII—5 per cent. credit to each part. If two straight lines or checks, or more or less than two crosses, or "yes," or "it does" is written in XI, and XII is left blank—2.5 per cent. credit to XI and 5 per cent. to XII. If the choice is made as though Tuesday did not come after Monday—2.5 per cent. credit to each XI and XII. If both XI and XII are left blank or both answered—no credit to either alternate direction, since no choice was made.

XIII. If three crosses are put between the two names—5 per cent. credit. If *three crosses* are put somewhere other than between the two names, for instance, x George x Henry x, or where *three* marks other than a cross, or more or less than three crosses, are put *between* the two names—2.5 per cent. credit, since these responses are better than none at all or than one that is absolutely wrong.

XIV and XV. If the choice is made on the basis that iron is heavier than water—5 per cent. credit to each XIV and XV. If the proper choice is made, but the connection between the numbers 3 and 5 of the preceding sentence is lost or not understood—2.5 per cent. credit to XIV and 5 per cent. to XV. As an example of this, sometimes 1,000,000 or some other large number is written in XIV or the word *iron* is written there. If the choice is made on the basis that water is heavier than iron—2.5 per cent. credit to each XIV and XV. (As a matter of fact one-tenth of the subjects thought water heavier "because it holds ships up.") If both XIV and XV are left blank or both answered—no credit to either alternate direction, since no choice was made.

XVI. If a cross is put after *winter*—5 per cent. credit; 2.5 per cent. credit (*a*) if *long* is written after *winter*, (*b*) if *long* is written after *winter*, and *short*

after *summer*, or vice versa, or (*c*) if the cross is put after *summer*. (One-third of the subjects took night to mean evening. They said "It stays light longer on summer nights" and "You can stay out later on summer nights.") These have at least discriminated between summer and winter and deserve more credit than those who leave both parts blank or put a cross in each.

XVII. If *no* is written—5 per cent. credit. If *down* or *down hill*—2.5 per cent. If *sometimes* or *yes in a pipe*, etc.—no credit.

XVIII. If the response is a literal repetition of XVII, whether the latter was correct or not—5 per cent. credit. If a paraphrase of the response to XVII—2.5 per cent. credit, otherwise none.

XIX. If the preceding question was omitted and the subject's attention called to the fact by this direction, if the former omission is corrected—5 per cent. credit whether the sum is filled in or not. If the preceding question was not omitted and the sum is not done, or if the sum is done and the preceding question was omitted—5 per cent. credit. (This is an awkward unit to grade and is not useful for stupid subjects, who skip it because they cannot do it, quite without reference to whether they have, or have not, omitted the preceding question. Some do it because "I was taught to write answers in school," again quite without reference to the response to the preceding question. The brighter subjects, too, who have chanced to skip the preceding question, have their attention called to the fact by this one. If they go back and correct the omission, they may, or may not, fill in the sum and have logic on their side in either case.)

XX. If the first letter of the first name and the last letter of the last name are put at the *ends* of the line—5 per cent. credit. If the right letters are put in the wrong place or the wrong letters in the right place—2.5 per cent. credit.

The hard-directions test was given to the College Maids and, with two omissions and two additional, to the Lab. Group. The records of the Bedford 88 in all probability would have been as like the latter in this as they were in the easy directions test.

*Results:* The 25th, median and 75th percentiles for accuracy are 85, 77.5 and 52.5 per cent. for the Reformatory women and 90, 90 to 87.5 and 67.5 per cent. respectively for the College Maids. The hard directions draw a clearer line of demarcation between the College Maids and the offender on the basis of the accuracy with which the directions are followed than did the easier list. In time, the percentiles for the College Maids are 155, 192 to 200, and 256 sec., respectively, and for the Reformatory women 202.8, 251.6 and 369.8 sec., respectively. Only two of the College Maids finished the test in the average time quoted by Woodworth and Wells for their subjects, i. e., 107 sec. Of the Reformatory women all but one were slower

than 134 sec., the slowest time of the University subjects. The one better record did 30 per cent. of the directions incorrectly. The percentiles for the indexes are 172.2, 238.1 to 275.5 and 309 sec. for the College Maids and 233.8, 348.3 to 361.5 and 639.5 sec. for the Reformatory women. Only 20 per cent. of the College Maids are as poor in index score as the poorest 50 per cent. of the Reformatory women and only 5 per cent. of them are as poor as the poorest 33 per cent. of the latter.

Although the Reformatory women are less accurate and very much slower at the three percentiles than the College Maids, it remains a fact that a fair portion of the latter, entirely efficient law-abiding women, are themselves not very alert mentally, as judged by this test. How much this mental slowness has proved a handicap to them economically can be answered only after we have norms for other groups of working women who have made their way successfully in other occupations than as maids in a college dormitory. The latter certainly calls for less versatility than is required to command high wages in a private household. In the college the maid is called upon to do but one or two things—iron, wait on table or corridor cleaning. The work is well systematized and much less complicated on the personal side than is work in a private house. The girl who wishes to do right can better protect herself from temptations than the factory girl or the clerk. Be this as it may, the College Maids have selected work well within their capacity and are stable and sensible enough to keep at such work, once it is undertaken.

The records in this test of 60 young women students of the Chicago Normal-College are enough poorer than the standards set by Woodworth and Wells' subjects, to suggest that we not take the low percentiles of the College Maids as too incriminating. The average time for the normal students is 118.8 sec. which is 11.8 sec. slower than the university average and one-fourth of them are slower than the slowest subject of Woodworth and Wells. Their percentiles are:

| | *25th* | *Median* | *75th* | Limits Upper | Lower |
|---|---|---|---|---|---|
| Per cent. of Acc. | 95 | 87.5 | 70 | 100 | 40 |
| Time in Sec. | 93 | 118.5 | 130 | 64 | 207 |
| Index in Sec. | 109.1 | 138.2 | 179.3 | 68 | 321.6 |

These 60 records were selected at random from those of a larger number of students who had been tested with the hard directions by Dr. Stella B. Vincent. We have graded them according to our own method of scoring.

There is a marked difference in the way these students and the Bedford 88 went at the test. Although the directions to both groups called for the highest possible accuracy in the least possible time, the Reformatory woman struggled at any cost of time to get every direction as nearly right as she could, while the students drove ahead sacrificing accuracy to speed. The same tendency of the criminal women to work deliberately and slowly toward the best possible results and of the more intelligent group to work quickly with much less than their maximal precision was evident again in a test reported later in this chapter—tracing a star in a mirror. Whereas the Bedford group plodded along trying to trace a perfect star though it took forever, the college students who were tested seemed to work on the principle that they would do best to accomplish a reasonable degree of accuracy in the least possible amount of time. These differences have industrial significance. The one group lends itself happily to the monotonous work of a factory where practise brings the time factor to an efficient point and where the tendency to make the product absolutely without flaw or variation is a practical necessity. The other group, which is quite unfit for such wearisome perfection, is alone efficient in a situation where new tasks must be met constantly with reasonable success in as expeditious a manner as possible.

These differences in method are equalized to a large extent in the index score in terms of which, therefore, it is best to compare the several groups. The test differentiates the University students, the Normal College girls, the College Maids and the Reformatory Women into four fairly distinct groups which overlap each other very little in index scores.

The easiest of these hard directions are I, II and IX, yet from 18 to 20 per cent. are unable to do even these correctly. The relative difficulty of the 20 hard directions may be estimated from Table 60. The hardest one is the 20th, which only 19 per cent. of the best quarter of the Reformatory women and only 25 per cent. of the College Maids accomplish without error. We are of the opinion that it would be better to re-word this direction so as to make more emphatic the fact that the two letters are to be put one at either end of the straight line at the bottom of the page, or if this change is not made, to deduct nothing if the correct letters are put at the end of the last line of print or any place on the straight line below. Another modification which we suggest, to obviate the confusion in the 17th direction noted above, is to re-word the text as follows: "Show by a cross when it grows dark earliest in the evening: in summer ..... or in winter ....."

Curiously enough, three of the simpler directions precipitated more entirely wrong responses than did the more complicated ones which required a choice of conditional reactions. The former required that a wrong answer be given to some such simple statement as the number of days in a week. The poorest quarter of the College Maids and all but the best quarter of the Reformatory women react very characteristically. There *are* 7 days in a week, Africa is *not* in China, 2 x 5 *are* 10 and they refuse to state the matter otherwise. Some are suspicious that the question is a trap, most are unimaginative, and few get the point or show the least sense of humor. "Yes of course it says to write 'no' but 2 x 5 *are* 10 and I ain't a'going to lie for nobody." "But it's just to see if you can do as you are told. Don't you remember I said that no matter how foolish it seemed, you were to do just what it said?" To this the usual reply is: "I don't care. I was taught that 2 x 5 are 10, and you can't catch me," or "It's silly to say 'yes'—China isn't in Africa." Nearly 52 per cent. fail to see the point of VIII, or refuse to give a wrong answer to the number of days there are in the week.

Of the alternate reactions, XIV and XV are the most difficult. Twenty-five fail to make any choice of reaction, 6 make a choice

on the wrong basis, *i. e.*, that iron is lighter than water, and 3 others make minor errors in filling out their choice of reaction. To XI and XII there are 17 total failures to make a choice of reaction; 3 choices are made on the wrong basis and there are 4 in which a minor error was made in filling out the response. To III and IV there were 15 failures to make a choice of reaction, 3 choices made on a wrong basis, and 3 other minor errors, such as saying that the sun rose *in the sky* or *in the west*, were made. To V and VI there were only 11 failures to make a choice of reaction and only three instances where the choice was made on the wrong hypothesis, but 16 minor errors were made. Most of these errors were instances where the force of the punctuation was lost and the number was put just after the colon. This mistake was made by only two of the College Maids, both of whom belonged to the poorest quarter with respect to their total accuracy scores. As high a percentage of the normal college students as of the Reformatory women fail to carry out correctly these alternate directions. The latter, of course, fail not because they cannot understand but because they work for speed and give insufficient time for clear understanding. The single directions they were able to carry out at a rapid rate with only a mistake now and then. To the question as to whether the nights were longer in summer or winter, 14 or nearly one-fourth of them wrote "summer." Dr. Vincent questioned them and found that they, too, took "night" as synonymous with "evening." This tends to confirm the supposition that the difficulty of this direction lies in the text. None of this normal group was disturbed by the request to give a wrong answer to the days of the week or to write *no* if 2 times 5 are 10, or to write *yes* no matter whether China is in Africa or not. To take exception to these or regard them with suspicion seems peculiar to the less intelligent groups.

The correlation + .77 between rank in the indexes of this test and in native ability is as high as in any test save Easy Opposites. The writer found these hard directions very valuable for clinical purposes.

## TABLE 60.

THE NUMBER OF RESPONSES TO EACH OF THE HARD DIRECTIONS WHICH ARE ALL WRONG AND THE NUMBER WHICH ARE ONLY PARTLY WRONG MADE BY THE FOUR QUARTERS OF THE LAB. GROUP WHEN DIVIDED INTO FOUR PARTS BY THE 25TH, MEDIAN AND 75TH PERCENTILE ACCURACY SCORES. LAB. GROUP 60 AND FOR THE BEST AND POOREST HALF OF THE COLLEGE MAIDS.

| Parts of Test | Lab. group 60 | | | | | | | | | | College Maids | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Best Quarter | | 2nd Quarter | | 3rd Quarter | | Poorest Quarter | | Total | | Best Half | | Poorest Half | | Total | |
| | All Wrong | Half Wrong | All Wrong | Half Wrong | All Wrong | Half Wrong | All Wrong | Half Wrong | All Wrong | Half Wrong | All Wrong | Half Wrong | All Wrong | Half Wrong | All Wrong | Half Wrong |
| I. | 0 | 0 | 1 | 0 | 1 | 0 | 9 | 0 | 11 | 0 | 0 | 0 | 2 | 0 | 2 | 0 |
| II. | 0 | 1 | 1 | 1 | 0 | 1 | 8 | 0 | 9 | 3 | 0 | 0 | 1 | 5 | 1 | 5 |
| *III. } | 0 | 0 | 0 | 0 | 3 | 0 | 12 | 0 | 15 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| IV. } | 0 | 1 | 1 | 1 | 5 | 1 | 12 | 0 | 18 | 3 | 0 | 0 | 1 | 0 | 1 | 0 |
| V. } | 0 | 0 | 2 | 0 | 2 | 0 | 8 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VI. } | 0 | 6 | 3 | 2 | 4 | 5 | 7 | 3 | 14 | 16 | 0 | 0 | 0 | 2 | 0 | 2 |
| VII. | 1 | 0 | 3 | 0 | 8 | 0 | 14 | 0 | 26 | 0 | 0 | 0 | 5 | 0 | 5 | 0 |
| VIII. | 1 | 0 | 7 | 0 | 9 | 0 | 14 | 0 | 31 | 0 | 3 | 0 | 4 | 0 | 7 | 0 |
| IX. | 0 | 0 | 0 | 0 | 1 | 0 | 10 | 0 | 11 | 0 | 0 | 0 | 2 | 0 | 2 | 0 |
| X. | 1 | 0 | 7 | 0 | 7 | 0 | 14 | 0 | 29 | 0 | 1 | 0 | 8 | 0 | 9 | 0 |
| XI. } | 1 | 0 | 1 | 2 | 5 | 1 | 13 | 1 | 20 | 4 | 0 | 2 | 4 | 1 | 4 | 3 |
| XII. } | 0 | 0 | 0 | 0 | 4 | 0 | 13 | 0 | 17 | 0 | 0 | 0 | 3 | 0 | 3 | 0 |
| XIII. | 0 | 0 | 0 | 2 | 1 | 4 | 9 | 4 | 10 | 10 | 1 | 0 | 1 | 2 | 2 | 2 |
| XIV. } | 2 | 1 | 5 | 1 | 12 | 0 | 12 | 1 | 31 | 3 | 3 | 1 | 7 | 0 | 10 | 1 |
| XV. } | 1 | 0 | 3 | 0 | 9 | 0 | 12 | 0 | 25 | 0 | 0 | 0 | 5 | 0 | 5 | 0 |
| XVI. | 0 | 3 | 1 | 6 | 0 | 9 | 8 | 4 | 9 | 22 | 0 | 6 | 2 | 5 | 2 | 11 |
| XVII. | 0 | 1 | 1 | 0 | 1 | 3 | 9 | 2 | 11 | 6 | 0 | 0 | 3 | 1 | 3 | 1 |
| XVIII. | 2 | 2 | 1 | 0 | 2 | 1 | 9 | 0 | 14 | 3 | 0 | 1 | 3 | 0 | 3 | 1 |
| XIX. | 0 | 0 | 3 | 0 | 7 | 0 | 10 | 0 | 20 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| XX. | 4 | 8 | 7 | 7 | 9 | 5 | 12 | 1 | 32 | 21 | 3 | 4 | 5 | 3 | 8 | 7 |
| Total | 13 | 23 | 47 | 22 | 90 | 30 | 215 | 16 | 365 | 91 | 11 | 14 | 58 | 19 | 69 | 33 |

*Those bracketed are the paired reactions.

## Section 4.—Ability to Tell Time.

A watch the size of a dollar Ingersoll was set at the following hours and the subject asked the time:

| | |
|---|---|
| 4.30 | 5.27 |
| 11.56 | 3.45 |
| 5.13 | 1.30 |
| 11.40 | 6.57 |
| 8.17 | 6.35 |
| 11.23 | 9.50 |
| 10.20 | 4.55 |
| 2.15 | |

*Results*: 1. All the College Maids were able to tell time promptly and well. Of the Bedford 88, 51 per cent. tell time accurately and promptly. In all, 58 per cent. of them *can* tell time, but 3.4 per cent. of them do so slowly and another 3.4

TABLE 61.

| Manner of Telling Time | 8th. Gr. | 7th. Gr. | 6th. Gr. | 5th. Gr. | Grade Group | | Below-Grade Group | | Bedford 88 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | No. | No. | No. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| Prompt and accurate | 10 | 11 | 10 | 6 | 37 | 68.5 | 8 | 23.5 | 45 | 51.2 |
| Accurate and slow | 0 | 0 | 2 | 0 | 2 | 3.7 | 1 | 2.9 | 3 | 3.4 |
| Accurate but careless | 0 | 1 | 1 | 0 | 2 | 3.7 | 1 | 2.9 | 3 | 3.4 |
| Right on right side, but slow on left side of the clock | 1 | 2 | 1 | 1 | 5 | 9.3 | 2 | 5.9 | 7 | 8.0 |
| Right on right side, but can tell minutes correctly only when minute hand is on the hours on left side of clock, *i. e.*, 5′ past, 10′ past, etc. | 1 | 0 | 0 | 1 | 2 | 3.7 | 1 | 2.9 | 3 | 3.4 |
| Can get the minutes right only when the minute hand is on hours. | 1 | 1 | 0 | 1 | 3 | 5.6 | 8 | 23.5 | 11 | 12.5 |
| On hours only, *i. e.*, one o'clock, two o'clock, etc. | 0 | 1 | 2 | 0 | 3 | 5.6 | 7 | 20.6 | 10 | 11.4 |
| Cannot tell even the hours on left side of clock. | 0 | 0 | 0 | 0 | 0 | 0.0 | 2 | 5.9 | 2 | 2.3 |
| Cannot tell time. | 0 | 0 | 0 | 0 | 0 | 0.0 | 4 | 11.8 | 4 | 4.6 |
| Total | 13 | 16 | 16 | 9 | 54 | | 34 | | 88 | |

per cent. are inexact from carelessness. Against this 58 per cent. of the Bedford 88, 65 per cent. of the Binet 200 tell time satisfactorily. The records for the latter were not kept in so detailed a manner as for the former and it is not possible to state how many were quick and exact, how many slow, nor how many careless. It is evident, however, that upon the whole the Bedford 88 are again like the larger group of 200.

2. Of the Grade Group, 85.2 per cent. tell time satisfactorily, whereas only 35 per cent. of the Below-Grade Group can do so. Of the latter group, 11.8 per cent. cannot tell time at all; 5.9 per cent. can tell time only on the right side of the clock, 20.6 per cent. only the hours, *i. e.*, that it is ten or two or twelve o'clock; 23.5 per cent. tell the minutes correctly only when the minute hand is on the hours, *i. e.*, five minutes past, ten minutes past, fifteen minutes to, twenty minutes to, etc.; 2.9 per cent. can tell the minutes correctly on the right side, but on the left only when the minute hand is at the hours.

The per cent. at each mental age of the Binet 200 who can tell time with fair success is as follows:

| Binet Age | Per cent. at each age that can tell time satisfactorily |
|---|---|
| 6 | 0 |
| 7 | 0 |
| 8 | 0 |
| 9 | 42 |
| 10 | 81 |
| 11 | 91 |

These ages are those of the final scoring of the Binet tests.

## Section 5.—Tests of the Juvenile Psychopathic Institute of Chicago.

### 1. *Cross Line Tests A and B and the Code.*

These tests are described by Healy[1] under the heading "Representation and Analysis." He points out that they involve ability to recall a given situation in its entirety and then ability to see the relationship of its different elements, to discriminate among them and analyze out the various portions separately. Any tests which, like these, demand the isolation of

[1] *The Individual Delinquent*, p. 90.

significant parts of a situation throw into relief powers of selective thinking.

The method of procedure and the directions were essentially those indicated in the Healy Monograph.[2] Cross-line test A was given first. The model was drawn for the subject and then the angle to the right was made just below and the subject asked to state what number belonged therein. If a wrong number was suggested she was told, "No, that isn't the right number. Look again at the whole figure and find out what number is in the part like this—that goes in this direction." As this last statement was made, we traced over the isolated angle for which the number was being sought. Every effort was made to explain in terms of this angle containing the "4", without actually telling the subject the number and without pointing to the "4" in the model. If she was unable to find the "4" for herself no other angle was used in explanation.[3]

After drawing the model and illustrating with section "4," the directions continued: "Now look carefully where each number is and see the way they go in the figure for I am going to take this picture away and draw each part down here by itself as I made this one in which the "4" goes and you must tell me what number belongs in each." The subject was then allowed to study the model for 15 seconds. The duller ones were apt to push the model away before this time was up to state "I can do it." These were asked, "Are you *sure* you can do it all right?" If the reply was "Yes" the test was begun

[2] Healy, William and Fernald, Grace M., "Tests for Practical Mental Classification." *Psych. Rev. Mon.*, No. 54, March, 1911, pp. 28–32.

[3] As a matter of fact in every such case the test was carried through in the hope that in the process of seeking numbers for all the angles the test would become clear, but it was solved by no subject who was unable to find the "4" in the preliminary explanation. In a few cases correct numbers were suggested for some of the angles but were only chance successes for where the same angles were repeated immediately thereafter in another order wrong numbers were offered.

at once. The parts of the figure were drawn one at a time in the following order: On the first and third trials 2—3—1—4 and on the second trial 4—1—3—2. Whatever number was offered for each we set down in the angle without comment; if a correction was offered a line was drawn through the first number and the new one substituted. If the four parts were not correctly numbered, the page was turned over and the subject asked to draw the whole design from memory and to put the numbers in it as they had been in the model. She was given help in this reproduction, if necessary, but was not allowed to see the model. When she had done the best she could, we crossed out any numbers that were wrong and substituted the correct ones, commenting merely: "Yours were not quite right. This is the way they go. Remember them this way." If she was not able to reproduce the two cross-lines, they were drawn for her. Aid was given only on the first reproduction. The watch was started as we drew the separate angles for the first trial and stopped when the test was correctly completed or terminated by failure at the end of the third trial at substituting the correct numbers in the separate angles.

*Test B.* The directions here were essentially the same as those employed in Test A. The figure consists of two parallel vertical lines cut into three equal parts by two parallel horizontal lines. The lines are all about 1½ inches in length. The nine spaces so formed were numbered from top to bottom beginning with the upper left hand corner as follows: 1, 2, 3, left column, 4, 5, 6, middle clumn, 7, 8, 9 right hand column. The figure was first drawn for the subject and then the portion in which the "7" belonged was drawn below in illustration of what was meant. Twenty instead of 15 seconds were allowed for study of the figure. The portions of the figure were presented for numbers in the following order: 5—1—6—7—4—9—2—3—8.

*The Code.* Cross-line tests A and B were given before the code, a fact to be noted before comparing our results with those in which the code was given as a part of the Binet tests without these preliminary tests. First what was meant by a code was explained. The idea of a secret language always met with a quick and eager response. The figures were then drawn and

lettered for the subject. (See Figure III.) The subject then asked what letter |‾ contained, and so, represented. Whatever letter she suggested was put in, but if it was not correct we said: "That isn't right, look again." The next letter suggested was set down and the first crossed out and this process continued until the correct letter "h" was suggested. Then she found the letter represented by |· and wrote the word "war" with the code before her. Finally she was told to study the code for a minute when it would be taken away and she would be asked to write in the code a message which we would give to her. When the minute was up, the message "Come quickly" was given her typewritten on a card and the stop watch started. When the message was completed, time was taken out while we looked through the result. If there was more than one error, the subject was told that her message was not entirely

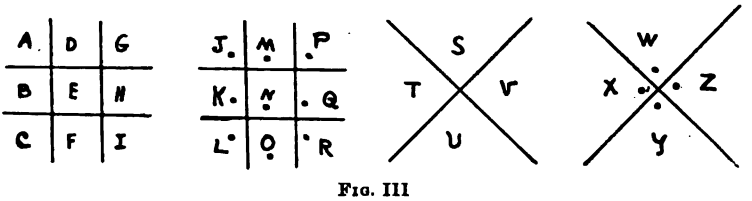



FIG. III

correct, the watch was started again, and she was given the rest of the 15 minutes, which was the time-limit, for corrections if necessary. The time recorded includes that consumed in making corrections.

In Tests A and B there are records for the first 50 of the group of 100 to whom the tests of the Bureau of Vocational Guidance were given. Seven of the 12 who were omitted from this 100 on account of language handicaps, thereby leaving the Bedford 88, were among this first 50. There remain, accordingly, 43 of the Bedford 88 with records for these tests. There are records for 185 of the Binet 200 in Test A and for 182 of them in Test B. The code was given to 182 of the Binet 200, but not to the Bedford 88. These tests were not included among those which time permitted us to give the College Maids.

In connection with another investigation the cross-line tests A and B were given to a small group of young women students

in the Chicago Normal College. Their records have been included here as a preliminary adult standard. In testing this group we were aided by Dr. Mabel R. Fernald. The list of their original scores are as follows:

*Cross Line Test A.*

| Subject | No. of Trials | Time in Sec. | |
|---|---|---|---|
| 1 | 1+ | 7.2 | |
| 2 | | 8.0 | |
| 3 | | 8.3 | |
| 4 | | 8.5 | |
| 5 | | 9.2 | |
| 6 | | 10.0 | |
| 7 | | 11.0 | |
| 8 | | 12.0 | |
| 9 | | 12.4 | |
| 10 | | 13.0 | |
| 11 | | 14.0 | (1 error; 1 correction) |
| 12 | | 15.0 | |
| 13 | | 15.4 | |
| 14 | | 21.6 | |
| 15 | | 34.1 | |
| 16 | | 38.8 | |

*Cross Line Test B.*

| Subject* | No. of Trials | Time in Sec. | |
|---|---|---|---|
| 16 | 1+ | 17.5 | |
| 10 | | 19.5 | |
| 18 | | 30.0 | |
| 3 | | 31.4 | |
| 4 | | 42.5 | |
| 12 | | 43.0 | |
| 1 | | 44.0 | |
| 9 | | 44.7 | |
| 8 | | 45.0 | |
| 2 | | 46.8 | |
| 11 | | 49.0 | (1 error; 1 correction) |
| 7 | | 50.0 | |
| 13 | | 50.0 | |
| 17 | | 57.0 | |
| 14 | | 75.8 | |
| 6 | | 119.0 | (2 errors; 2 corrections) |
| 15 | 2+ | 99.0 | |

* Subject No. 5 of Cross Line Test A is not included here because there is no time record for this test. She solved B on the first trial. Subjects 17 and 18 in Test B had no time records for Test A. Both solved A on the first trial.

*Results:* While approximately one-half the criminal women have difficulty with the substitutions in the dismembered sections of the model on the first trial in Test A, and about two-thirds in Test B, few, at least of those who in the end pass the test, have difficulty or need aid in the reproduction of the whole figure. Clearly the power of recall is within the capacity of more of them than is the power to analyze what they have recalled. These tests really give one a very fair indication of those who are unable to think out effectively such a simple situation as these typify. Healy holds that Test A is done by nearly all his normal children of 10 by the first or second trial, Schmitt that 90 per cent. of the 3rd-grade children and 100 per cent. of the 5th grade are able to accomplish it on the first trial. These children were given one more trial than our subjects, but another trial would have made no appreciable difference in our results. We suspect that our directions were more exacting, that our subjects were left a little more to their own devices in thinking out the situation than were the children. In any case, the test proved more difficult for the Reformatory women than the grades they had succeeded in passing upon leaving school would seem to warrant, in terms of Schmitt's results. Even so, however, there is a fair correspondence between our group and hers. Nearly all of the Grade Group succeeded on the first or second trial and the test was easy enough so that it was passed by 50 per cent. of the Below-Grade Group.

Twenty-seven and nine-tenths per cent. of the Bedford 88, 35.2 per cent. of the Binet 200, or about one-third of the Criminal Women, fail in the test. In all the tests of the Bureau of Vocational Guidance about one-third of the scores of the Bedford 88 were found to pile up at the poorest end of the curves that distributed the records of the working children. This test seems to indicate that this poorest third really do less well than the child of ten.

The list of original scores indicates that the degree of overlapping of the Grade Group and Below-Grade Group is slight, only 12.5 per cent. of the latter overlap the median score of the former. The median record of the Below-Grade Group is

Acc. 3+, Time, 121 sec., for the Grade Group, Acc. 1+, Time 16 sec.

In Test B, Schmitt finds that 84 per cent. of the 4th grade and 94 per cent. of the 5th grade solved this test on the first or second trial, that 100 per cent. of the 6th grade solved it on the first trial. Only about one-third of our Grade Group solved the test on the first trial and none of the Below-Grade Group, all of whom save 12.5 per cent. failed in the solution. The median of the two groups is:

| | |
|---|---|
| Grade Group | 1+, 140.2 sec. |
| Below-Grade Group | 3—, 370.2 sec. |

Test B, too, proves more difficult than for Schmitt's children of corresponding grades. Healy found, however, that whereas 96 per cent. of his cases of recidivists from 11 to 15 years who were unretarded in school solved the test, only 59 per cent. of those who were retarded more than two years succeeded. Practically all of the Below-Grade Group and nearly half of the Grade Group, or approximately two-thirds of the Bedford 88 were retarded more than two years upon leaving school and are more comparable, therefore, to Healy's retarded group, between whose records and ours there is a close correspondence. Fifty-one and two-tenths per cent. of the Bedford 88, 48.3 per cent. of the Binet 200 succeeded in solving this test.

The number of trials necessary for solution by those of the various Binet ages for Tests A and B are given in Tables 63 and 65. (These Binet ages were obtained by the original count of the Binet tests.) In Test A, 7.5 per cent. of the 11-year-olds, 22.9 per cent. of the 10-year-olds, 45.5 per cent. of the 9-year group, 69.2 per cent. of the 8-year group, and 100 per cent. of the 7 and 6-year groups fail to pass the test. In Test B, 17.9 per cent. of the 11-year-old group, 38.2 per cent. of the 10-year-old group, 77.3 per cent. of the 9-year group, 76.9 per cent. of the 8-year group and 100 per cent. of the 7 and 6-year-old groups failed to solve the test.

Table 62 for Test A and Table 64 for Test B, include the percentage of the Bedford 88–43, the Binet 200, and the Normal College girls who solved the test on the first, second or third

trial, respectively, and who made errors which they failed to correct and so only partially succeeded in the substitutions. Again it appears that the 88 whom we have compared with the working girls of Cincinnati are as typical of the Reformatory women as a much larger group would have been.

The list of original scores for Test A indicates that there is a very close correlation between time and number of trials necessary for solution. The scores for the Bedford 88–43 vary from 8.4 to 320 sec. The time for those who solved it on the first trial varies from 8.4 to 26.8 sec., for those who solved it on the second trial from 53.6 to 240 sec., for those who solved it on the third trial from 240 to 458 sec. Those who failed to solve it vary in time from 120 to 320 sec. For the Binet groups the average time, the A. D., and the limits for the different Binet ages are given in Table 63.

In Test B the time varies from 17.5 to 119 sec. for the normal girls, from 42 to 658.8 sec. for the Bedford 88–43. Those who solved it on the first trial vary from 42 to 142.2 sec., those who solved it on the second trial from 66 to 373 sec., those who solved it on the third trial from 302.4 to 632.4 sec., and those who failed to solve it from 105 to 658.8 sec. For the Binet 200 the average time, the A. D., and the limits for the various Binet ages are given in Table 65.

If one wishes to infer from an individual's relative success in solving this test, what her relative place among the inmates is in general intelligence and in ability to profit by the training of the Reformatory, it is useful to add the time of solution to Healy's method of scoring. Without time scores the only basis for individual differences is the number of trials necessary for solution, and all who solve it on the first trial must have an identical rank, and so for the second and third trials. If, on the other hand, the test is timed, one can secure a finer scale of individual difference by ranking those who solve the test on the first trial in order of time, then those who solve it on the second trial in order of time, etc. Between such a ranking and general mental ability there is found to be a fairly good positive correlation. The index in Test A is $r = +.58$, P.E. = .071; in Test B, $r = +.52$, P.E. = .078.

The data for the code are given in Table 66. Healy states that 14-year-old court cases of "ordinary ability" ought to write the message "Come quickly" with, at most, not more than 4 errors. Schmitt found that the 6th grade averages 3 errors. Thirty-four and six-tenths per cent. of the Binet 200 were so dull that it proved impossible to explain the idea of a code at all. Besides these, 36.6 per cent. made more than 1 error of which they failed to correct all but one. Of these, two made 2 errors, five 3 errors, two 4 errors, and fifty-seven more than 5 errors. Twenty-nine and one-tenth per cent. made not more than 1 error or, if more were made, succeeded in correcting all but 1 of them. Here again, as in the Woolley tests, about one-third of the Criminal Women are as successful in the accuracy of their solution as the 14-year-old child or as the average 6th-grade pupil who is up to grade, and the poorest third extremely dull. Healy does not give Schmitt's data for grades lower than the 5th, so we cannot estimate to what grade the scores of the poorest third of the Reformatory subjects most nearly correspond.

As stated above, the idea of a secret language strongly appeals to such a group as ours. They work very hard to learn to use it and the test presents an ideal opportunity to observe how well they can manipulate material thus presented to them as a whole, in a situation which requires analysis and abstraction of the various elements when the material is no longer present in perceptual form. Perhaps, as it stands, since it is so difficult for the majority, it does not pay for the time it takes. If time for testing is limited, a shorter message might be substituted. Certainly, to succeed with the code, is excellent evidence of good mental ability.

The writer has found Tests A and B rather more valuable as a basis for diagnosis than the indexes of correlation with general ability would seem to indicate.

TABLE 62.

NUMBER AND PER CENT. OF BEDFORD 88–43, BINET 185* AND 16 NORMAL —COLLEGE GIRLS WHO SOLVE AND WHO FAIL TO SOLVE CROSS LINE TEST A.

| | 43 of the Bedford 88 | | 185 of the Binet 200 | | 16 Normal—College Girls | |
|---|---|---|---|---|---|---|
| | No. | Per cent. | No. | Per cent. | No. | Per cent. |
| *Test Solved* | | | | | | |
| 1 + †..... | 22 | 51.3 | 95 | 51.3 | 14 | 87.5 |
| 2 +..... | 7 | 16.2 | 16 | 8.6 | 2 | 12.5 |
| 3 +..... | 2 | 4.5 | 9 | 4.9 | 0 | 0 |
| Total..... | 31 | 72. | 120 | 64.8 | 16 | 100 |
| *Test not Solved* | | | | | | |
| 3 — †..... | 12 | 27.9 | 45 | 24.4 | 0 | 0 |
| Failure..... | 0 | 0 | 20 | 10.8 | 0 | 0 |
| Total..... | 12 | 27.9 | 65 | 35.2 | 0 | 0 |
| Grand Total. | 43 | 99.9 | 185 | 100 | 16 | 100 |

*There were fifteen records which were either lacking or ambiguous and so were omitted from the two hundred. Of these, eight were from the group with the Binet age of 11 years, four from the 10-year-old group, and three from the 9-year-old group.

†1 +, 2 +, 3 + mean solved on 1st, 2nd or 3rd trial, respectively. 3— means errors on third trial that were uncorrected.

TABLE 63.

BINET AGE CORRELATED WITH NUMBER OF TRIALS AND TIME IN SECONDS REQUIRED FOR SOLUTION OF CROSS LINE TEST A.

| Binet Age | 12 Yrs. | | 11 Yrs. | | 10 Yrs. | | 9 Yrs. | | 8 Yrs. | | 7 Yrs. | | 6 Yrs. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Per cent | No. | Per cent. | No. | Per cent. | No. | Per cent. | No. | Per cent. | No. | Per cent. | No. | Per cent. |
| *Test Solved* | | | | | | | | | | | | | | |
| 1 + * | 1 | 100 | 31 | 77.5 | 41 | 58.6 | 19 | 43.2 | 3 | 23.1 | 0 | 0.0 | 0 | 0.0 |
| 2 + * | | | 5 | 12.5 | 7 | 10.0 | 4 | 9.1 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 3 + * | | | 1 | 2.5 | 6 | 8.6 | 1 | 2.3 | 1 | 7.7 | 0 | 0.0 | 0 | 0.0 |
| Total | 1 | 100 | 37 | 92.5 | 54 | 77.1 | 24 | 54.5 | 4 | 30.8 | 0 | 0.0 | 0 | 0.0 |
| *Not Solved* | | | | | | | | | | | | | | |
| No. 3— * | | | 2 | 5.0 | 16 | 22.9 | 15 | 34.1 | 6 | 46.1 | 6 | 40.0 | 0 | 0.0 |
| No. Failures | | | 1 | 2.5 | 0 | 0.0 | 5 | 11.4 | 3 | 23.1 | 9 | 60.0 | 2 | 100. |
| Total | | | 3 | 7.5 | 16 | 22.9 | 20 | 45.5 | 9 | 69.2 | 15 | 100. | 2 | 100. |
| Av. Time | | | 50.3″ | | 104.1″ | | 141.9″ | | 358.2″ | | 108.3″ | | Time | |
| A. D. | | | 55.2″ | | 94.5″ | | 83.2″ | | 361.2″ | | 52.2″ | | not | |
| Limits | | | 5–420″ | | 6–360″ | | 8–320″ | | 25–900″ | | 30–185″ | | given | |

* See footnotes to Table 62.

TABLE 64.

NUMBER AND PER CENT. OF BEDFORD 88–43, BINET 182*, AND 17 NORMAL-COLLEGE GIRLS WHO SOLVE AND WHO FAIL TO SOLVE CROSS LINE TEST B.

| | 43 of the Bedford 88 | | 182 of the Binet 200 | | 16 Normal—College Girls | |
|---|---|---|---|---|---|---|
| | No. | Per cent. | No. | Per cent. | No. | Per cent. |
| *Test Solved* | | | | | | |
| 1 +†..... | 14 | 32.6 | 49 | 26.9 | 16 | 94.1 |
| 2 +..... | 5 | 11.6 | 21 | 11.5 | 1 | 5.9 |
| 3 +..... | 3 | 7.0 | 18 | 9.9 | 0 | 0.0 |
| Total..... | 22 | 51.2 | 88 | 48.3 | 17 | 100 |
| *Test not Solved* | | | | | | |
| 3 —..... | 19 | 44.2 | 52 | 28.6 | 0 | 0.0 |
| Failure..... | 2 | 4.7 | 42 | 23.1 | 0 | 0.0 |
| Total..... | 21 | 48.8 | 94 | 51.7 | 0 | 0.0 |

*There were eighteen records which were either lacking or ambiguous and so were omitted from the two hundred. Of these, nine were from the group with the Binet age of 11 years, six from the 10-year-old group, and three from the 9-year-old group.

†1+, 2+, 3+, mean the test was solved on the 1st, 2nd or 3rd trial, respectively; 3— means errors on the 3rd trial which were uncorrected.

TABLE 65.

BINET AGE CORRELATED WITH NUMBER OF TRIALS AND TIME IN SECONDS REQUIRED FOR SOLUTION OF CROSS LINE TEST B.

| Binet Age | 12 Yrs. | | 11 Yrs. | | 10 Yrs. | | 9 Yrs. | | 8 Yrs. | | 7 Yrs. | | 6 Yrs. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Trial | No. | Per cent. | No. | Per cent. | No. | Per cent. | No. | Per cent. | No. | Per cent. | No. | Per cent. | No. | Per cent. |
| *Test Solved* | | | | | | | | | | | | | | |
| 1+* | 1 | 100 | 25 | 64.1 | 20 | 29.4 | 3 | 6.8 | 0 | 0 | 0 | 0. | 0 | 0. |
| 2+* | 0 | 0 | 5 | 12.8 | 13 | 19.1 | 2 | 4.6 | 1 | 7.7 | 0 | 0. | 0 | 0. |
| 3+* | 0 | 0 | 2 | 5.1 | 9 | 13.2 | 5 | 11.4 | 2 | 15.4 | 0 | 0. | 0 | 0. |
| Total | 1 | 100 | 32 | 82.1 | 42 | 61.8 | 10 | 22.7 | 3 | 23.1 | 0 | 0. | 0 | 0. |
| *Not Solved* | | | | | | | | | | | | | | |
| 3—* | 0 | 0 | 6 | 15.4 | 18 | 26.5 | 21 | 47.7 | 5 | 38.5 | 2 | 13.3 | 0 | 0. |
| Failure | 0 | 0 | 1 | 2.5 | 8 | 11.7 | 13 | 29.6 | 5 | 38.4 | 13 | 86.7 | 2 | 100. |
| Total | 0 | 0 | 7 | 17.9 | 26 | 38.2 | 34 | 77.3 | 10 | 76.9 | 15 | 100.0 | 2 | 100. |
| Av. Time | 60″ | | 219.4″ | | 319.8″ | | 482.7″ | | 410.2″ | | 120″ | | Time | |
| A. D. | 0 | | 177.7″ | | 176.5″ | | 185.8″ | | 155.2″ | | 0 | | not | |
| Limits | 0 | | 18–715″ | | 33.2–840 | | 95–900″ | | 230–643 | | 0 | | given | |

* See footnotes to Table 64.

## TABLE 66.

BINET AGE CORRELATED WITH NUMBER OF TRIALS AND TIME IN SECONDS REQUIRED FOR SOLUTION OF THE CODE

| Binet Age | 12 Year | | 11 Year | | 10 Year | | 9 Year | | 8 Year | | 7 Year | | 6 Year | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Trial | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per. Cent. |
| Without error | 1 | 100 | 10 | 25. | 9 | 13.4 | 1 | 2.3 | 0 | 0. | 0 | 0. | 0 | 0. | 21 | 11.5 |
| One error | 0 | 0 | 6 | 15. | 2 | 3.0 | 0 | 0.0 | 0 | 0. | 0 | 0. | 0 | 0. | 8 | 4.4 |
| More than one error all corrected | 0 | 0 | 7 | 17.5 | 11 | 16.4 | 3 | 6.8 | 0 | 0. | 0 | 0. | 0 | 0. | 21 | 11.5 |
| More than one error, all but one corrected | 0 | 0 | 0 | 0. | 3 | 4.5 | 0 | 0.0 | 0 | 0. | 0 | 0. | 0 | 0. | 3 | 1.7 |
| *Total solved* | 1 | 100 | 23 | 57.5 | 25 | 37.3 | 4 | 9.1 | 0 | 0. | 0 | 0. | 0 | 0. | 53 | 29.1 |
| More than one error left uncorrected | | | 13 | 32.5 | 34 | 50.7 | 13 | 29.5 | 5 | 38.5 | 1 | 6.6 | 0 | 0. | 66 | 36.2 |
| Failures | | | 4 | 10.0 | 8 | 11.9 | 27 | 61.3 | 8 | 61.5 | 14 | 93.3 | 2 | 100. | 63 | 34.6 |
| *Total not solved* | | | 17 | 42.5 | 42 | 62.6 | 40 | 90.8 | 13 | 100. | 15 | 99.9 | 2 | 100. | 129 | 70.8 |
| Av. Time* | | | 521.0″ | | 679.3″ | | 717.5″ | | 1370″ | | | | | | | |
| A. D. | | | 237.2″ | | 331.6″ | | 423.1″ | | | | | | | | | |
| Range | | | 100–1016″ | | 1408–1584.8 | | 133–2255″ | | | | | | | | | |

*Originally not calculated for all the Binet ages and necessary data not now at hand.

2. *Construction Tests A and B.*

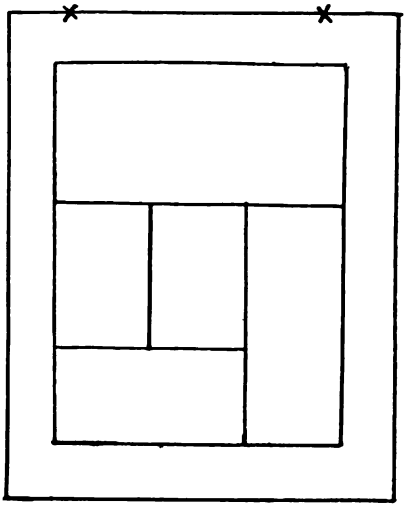


FIG. IV.—Test A.

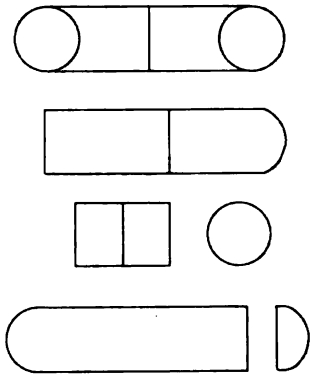


FIG. V—Test B.[4]

Construction Tests A and B are shown in Figures IV and V, which are one-fourth the actual size. In our form of A the frame had a wooden bottom as well as sides and a wooden lid which was hinged to the puzzle at the points marked "X." This lid was shut down over the blocks when the puzzle was first shown to the subject. Test B, like A, was made of wood.

These tests were used by Healy to bring out the capacity of the juvenile delinquents "to plan a bit of work . . . . to see the possibility and impossibility of situations before they are actually attempted." They set a problem in the solution of which one may (1) think, plan the procedure in such wise as to make a minimum of errors, (2) proceed without thinking and so make errors, but learn by mistakes and avoid their repetition, or (3) stumble blindly ahead repeating errors, not profiting by experience and either failing totally to solve the

[4] "The standard width of all the spaces in the pattern is one and three-eighths inches. The spaces which have only one rounded end are five inches long and the rectangle is two inches long." Healy and Fernald, *Op. cit. p. 16.*

test or accomplishing it merely by chance. In Test B, for instance, if an individual thinks, he can at least avoid putting a circle in a square place, or leaving the moon-shaped hole vacant; if he can not think the puzzle out so as to make no absurd, impossible moves, he may at least profit by his mistakes and avoid repeating the more impossible ones. On the other hand, the duller ones may not even employ a trial-and-error method, but may continue indefinitely putting in and taking out the blocks in a haphazard, foolish manner without apparent awareness of the shape and the number of the holes or of the pieces that are to fill them.

The directions for A were: "I have here a little box in which there are some blocks. I will put them out on the table and you see how quickly you can put them all back in. All the pieces will go in and will fit so there will be no little empty spaces. The space will all be filled up. You see the lid fastens down tightly so that all the blocks are inside." The pieces were then tumbled out in such a manner that the subject did not see their arrangement in the frame. "Ready. Go!" The watch lay face up on the table on a piece of felt so that its ticking would not be distracting. If the subject said, "I can't do it," or "I don't like puzzles," or "I never could do puzzles," etc., which was not infrequently the case, we said: "Well, just try your very best, because you want to have a good record in the office. Besides it is easy and you may surprise yourself and get it after all."

The directions for B were: "This is a puzzle something like the other one, only a little harder. The pieces will all go in and leave no empty spaces—not even little ones when you get them right. If you find it's coming out wrong, you can take any or all of the pieces out and put them in over again. Try to get them all in as quickly as you can; and try not to make foolish mistakes."

If at the end of 10 minutes the pieces were not all in, Test A was terminated and the performance credited as a failure. Test B was similarly terminated at the end of 15 minutes. Only, sometimes, if the subject was still absorbed in the task, she was not interrupted. It is astonishing how long and uncritically

some of the more stupid women will persevere in a task completely beyond their understanding. In the event of a chance solution of the test after 15 minutes were up, the record was still registered as failure.

The method of scoring followed as nearly as possible that indicated in the *Monograph.*[5] The time was recorded together with (*a*) the total number of moves in addition to and not including the necessary five, (*b*) the number of moves that were *impossible*, and (*c*) the *repetitions of impossible moves.* Impossible moves are, according to Healy, "cases in which a piece is left in an evidently impossible situation, that is, where it leaves a space obviously unfitted to any of the remaining pieces." We recorded as an impossible move, also, attempts to try to crowd a piece into a space where there could be *no doubt* but that it would *not* go, *e. g.*, a circle in a square, a fairly good sized piece in a crevice, etc.

These tests were given to one group only—the Bedford 88.

*Results: Test A:* The time scores, exclusive of failures, vary from 5.2 to 516.4 seconds. (See original scores.) The 25th, median, and 75th percentiles are 18, 36 and 108 seconds, respectively. The number of errors become greater and the type of error less excusable as one passes from the quickest to the slowest time score. Repetition of impossible moves is confined almost entirely to the slowest quarter. The best quarter, as to time-scores, make on the average but 1.1 additional moves and only .09 impossible errors. The next quickest quarter make an average of 3.9 additional moves, 1.3 impossible moves, and no repetitions thereof. The third quarter average 9.8 additional moves, 5.9 impossible moves, and 2.1 repetitions thereof, while the slowest quarter average 32.6 additional moves, 14.3 impossible moves, and 15.8 repetitions thereof. (Table 67.)

There are four failures to accomplish this test, which Healy finds no normal person over 8 or 9 years should fail to do in 5 minutes. Twenty-three Reformatory women took longer than 2 minutes, the time set by Healy as the lower limit for the majority of 12-year-old children who are up to grade. The

[5] *Op. cit.* pp. 14–17.

child of 12 solves the test, also, "without replacing pieces in obviously impossible positions."[6] This, 33 of our subjects fail to do. Seventeen of the 19 women who were slower than the majority of the 12-year-old children were actually slower than the average time (2′–7″) required by Schmitt's 2nd grade children.

The percentiles for the Grade Group and the Below-Grade Group for time and errors are:

| | 25th | Median | 75th | Upper Limit | Lower Limit |
|---|---|---|---|---|---|
| Grade Group | 14″<br>1 er. | 30″<br>7 er. | 81″<br>18.5 er. | 5.2″<br>0 er. | 600+<br>68 er. (2 failures) |
| Below-Grade Group | 23″<br>7 er. | 89″<br>16.5 er. | 117″<br>57 er. | 7.4″<br>1 er. | 600+<br>175 er. (2 failures) |

TABLE 67

CONSTRUCTION TEST A

*Average Number and Average Deviation of Additional Moves, Impossible Moves, and Repetition of Impossible Moves Made by Each Quarter of the Bedford 88, Arranged in the Order of Time Consumed in Completing the Test.*

| | | Additional Moves | Impossible Moves | Rep. Imp. Moves | Range in Total Number of Additional Moves, Impossible moves and R. I. M. | |
|---|---|---|---|---|---|---|
| | | | | | Highest | Lowest |
| 1st Quarter in time from 5.2″ to 18″ | Av.<br>A. D. | 1.13<br>1.01 | .09<br>.16 | 0<br>0 | 0 | 5 |
| 2d Quarter in time from 18″ to 36″ | Av.<br>A. D. | 3.86<br>1.95 | 1.27<br>1.21 | 0<br>0 | 3 | 11 |
| 3d Quarter in time from 47″ to 108″ | Av.<br>A. D. | 9.82<br>4.32 | 5.91<br>3.04 | 2.05<br>1.60 | 6 | 34 |
| 4th Quarter in time from 121.4″ to four failures in 600″ | Av.<br>A. D. | 32.59<br>11.46 | 14.32<br>7.42 | 15.82<br>12.50 | 27 | 175 |

[6] For these norms, see *The Individual Delinquent*, p. 107.

*Test B:* Arranged in the order of time involved in the solution of the puzzle, the best quarter range in a gradual progressive series from 18 to 60 seconds, the next quarter from 60 to 116.8 seconds, the third from 118.6 to 278.4 seconds, and the poorest quarter, in a much less gradual fashion, from 292.6 to 900 seconds and over. *All (ten individuals) who had not solved the puzzle in 9 minutes and 13 seconds had still not solved it at the end of fifteen minutes.* A time limit, therefore, of more than 10 minutes is unnecessary for a group such as this. (See original scores.)

As with time scores, there is a wide range of individual differences in the number and character of the errors. (Table 68). Those who solved the puzzle in 60 seconds or less made 3.9 errors on the average, with an A. D. of 3.34 errors. P.E. is 2.09, and the variation from a normal distribution is due to two extreme records of 10 and 28 errors, whereas none of the others made over 6 errors. The highest number of errors made by this group is 28; the mode is zero. The second best quarter in time of solution make 12.41 errors on the average, with an A.D. of 5.48 errors, a range from 2 to 32 errors and a mode of 8 to 12 errors. The third quarter, varying in time from 118.6 seconds to 278.4 seconds, make an average of 32.95 errors, with an A.D. of 10.99, a range of 5 to 68 and a mode of 34 errors. The poorest quarter ranges from 35 to 241 errors (including ten failures), with an average of 107.55 errors and an A.D. of 48.55 errors. Only two of the poorest quarter overlap the next to the poorest quarter, and they are both above the average score of the latter. Of the next to the best quarter in time, all but five make more than 6 errors, while all but two of the best quarter make less than 6 errors.

There are few impossible errors or repetitions of them, in contrast to the number in Test A. This seems in part to be explained by the fact that there is a more obvious resemblance between the places to be filled and the pieces that go into them than in A. Not a few of our subjects spontaneously remarked that B was easier than A and most of them took to it more kindly than to A. Then, too, A had served as so much preliminary training in this type of puzzle situation.

With respect to standards Healy finds that the majority of his 12-year-old unretarded children solved the test in from 1 to 3 minutes and that it should be done normally with, at most, 26 moves. Since Schmitt found that there were no failures as early as the 4th grade and that the average time record of this grade, 130 secs., was not improved upon by the 5th or 6th grades, we are not surprised to find 35 per cent. of the Below-Grade Group solving the test in this time or less and with 26 errors or less. The median time of this group is 239 secs., their average not far from the same figure. The median of the Grade Group is 89.9 secs., which is a decided gain. (Table 69.) We suspect that, had Schmitt obtained records for the 7th and 8th grade groups, their average time would have been very appreciably quicker than the average for the 4th, 5th and 6th grades.

The thing in our results which calls for explanation is the fact that so many of the Grade Group do less well than Schmitt's 4th grade—33 per cent. of them make more than the standard 26 errors and 31 per cent. are slower than 130 secs. In part, this is a bi-product of the fact that the test calls for more concentration of attention than a number of the drug cases were able to command; chiefly, however, it reflects the unhappy reception accorded puzzle-tests by a fair proportion of the brighter women, who characterize the tests as "childish" and "silly," and who stoutly assert that they "don't like puzzles," or disinterestedly and languidly affirm they "can't do it." Very few of the women go at the solution of either A or B with the interest and absorption commonly displayed by the court children. Some of the lower time-scores of the Grade Group and their haphazard methods of work indicated, in consequence, not so much lack of initiative and ingenuity or of ability to plan work as lack of foresight. They all knew that at some later time a good record was likely to benefit them in the way of effecting an earlier parole, yet, because the performance of the test held no immediate interest for them and because the solution involved effort and thought, they refused to try.

Any test which reveals a subject's unwillingness to work for the sake of future welfare is valuable in individual diagnosis. As they stand these tests are useful for this purpose. On the

other hand, one must work disproportionately hard to stimulate a derived interest in the tests or to make impelling any consciousness of their remote value, and even then one does not always succeed in securing a measure of a woman's ability to plan ahead in her undertakings or to profit by experiences. On the whole, we are inclined to think that some modification of these puzzles which would make them intrinsically more interesting to all of such a group as we tested would lead to more valuable data respecting their methods of work.

The usefulness of these construction tests for thoughtful methods, trial-and-error methods or completely blind and haphazard procedure on the part of the subject should, as in the other tests, be checked in terms of the correspondence of their results with some reliable estimation of the methods of work and the response to training which has characterized the subject's actual conduct and work in the Reformatory. When the scores of Test A are arranged in the order of time of solution, their correlation with the ranks accorded the same individuals in native capacity to profit by institution training is $r = +.51$, P.E. = .055. The correlation with rank in Easy Opposites is low ($r = +.34$, P.E. = .066). Rank in Test B in time, on the other hand, has a correlation of $r = +.57$, P.E. = .050, with estimated rank of their native ability and a correlation of $r = +.48$, P.E. = .057, with accuracy in Easy Opposites, arranged in the order of time. In Test B the correlation between general ability and rank on the basis of type of errors is $r = +.60$, P.E. = .048, and with accuracy in Opposites, arranged in the order of time, is $r = +.53$, P.E. = .53. The correlation, whether between native ability and time of solution or type of error, is practically identical.[7]

[7] In rank on the basis of errors, a rank of one was accorded to the individual with no impossible moves and the least number of additional moves, through those who make the fewest impossible moves to those who make the most, through those who make the fewest repetitions of impossible moves to those who make the most. When any two scores in number of impossible moves were alike, the one with the fewest number of additional moves was given the highest rank and where two or more had the same number of repetitions of impossible moves, the number of impossible moves determined the rank in the same way.

Test B is thus more useful than Test A. How much this is a product of the order in which the puzzles were given, is a matter of conjecture. As an introductory preparation for what is expected in Test B, it is likely that Test A is equally useful.

TABLE 68.

CONSTRUCTION TEST B.

*The Total Number of Additional Moves (Including Impossible Errors and Repetition of Impossible Errors).*

| Of Bedford 88 | | Moves |
|---|---|---|
| Best Quarter, | Average | 3.91 |
| in time from | A. D. | 3.34 |
| 18" to 60" | P. E. | 2.09 |
| | Mode | 0 |
| | Range | 0–28 |
| Second Quarter, | Average | 12.41 |
| in time from | A. D. | 5.48 |
| 60" to | P. E. | 4.5 |
| 116.8" | Mode | 8 and 12* |
| | Range | 2–32 |
| Third Quarter, | Average | 32.95 |
| in time from | A. D. | 10.99 |
| 118.6" to | P. E. | 9.49 |
| 278.4" | Mode | 34 |
| | Range | 5–68 |
| Poorest Quarter, | Average | 107.55 |
| in time from | A. D. | 48.55 |
| 292.6" to | P. E. | 37.55 |
| 900." | Mode | None |
| | Range | 35–241 |

*The mode is misleading as the greater frequency at these points is insignificant. In only the first quarter was there a real point of greatest frequency in the distribution of the scores.

TABLE 69.

PERCENTILES FOR THE VARIOUS GROUPS IN TIME CONSUMED IN PERFORMING CONSTRUCTION TEST B.

| Groups | 25th Percentile | Median | 75th Percentile | Upper Limit | Lower Limit |
|---|---|---|---|---|---|
| Below-Grade | 97.6 sec. | 239. sec. | 506. sec. | 18. sec. | 900. sec. |
| | 16. cr. | 45. cr. | 76.0 cr. | 3. cr. | 239. cr. |
| Grade Group | 43. sec. | 89.9 sec. | 160.6 sec. | 20. sec. | 900. sec. |
| | 3. cr. | 11. cr. | 33. cr. | 0 cr. | 117. cr. |
| Vth Grade | 60. sec. | 116.8 sec. | 220.6 sec. | 20. sec. | 900. sec. |
| VIth Grade | 42.5 " | 73.2 " | 230.5 " | 30. " | 1200. " |
| VIIth Grade | 36. " | 83.4 " | 122.7 " | 29. " | 330. " |
| VIIIth Grade | 76.4 " | 114.6 " | 160.6 " | 41. " | 294. " |

## Section 6. Formation of New Motor Habits.

### *Tracing Star in Mirror.*

As a measure of practice effect and the acquisition of skill, the results of the Mirror Drawing test are to appear in a separate monograph as one of a group of factory and learning tests designed to estimate the industrial efficiency and the learning capacity of the criminal woman. A brief account of the test is included here also, because it has served better than any other which we tried out at Bedford to isolate the women who are incapable of sustained effort or of emotional control.

The directions for the test were those of the first edition of Whipple's *Manual*, with emphasis, for the Reformatory woman, upon the fact that the more precisely and quickly she was able to trace the red star, the better would be her record in the superintendent's office; that the better worker she thus proved herself to be, the sooner she might expect to be paroled. The College Maids were informed that we wanted to secure, as a standard in the work at Bedford, the best possible sample of the skill and rapidity with which law-abiding, efficient, self-supporting girls, like themselves, could trace the star.

Five successive stars, as indicated in the Whipple *Manual*, were drawn by the subject and the errors counted as Whipple indicated, *i. e.*, each corrective movement, however slight, that marked an effort to get back on the red line counted as one error. The test was given to 69 Reformatory Women, to 16 College Maids and to 36 College Students.[1]

*Results:* In both the first and the last trial, both as to time and errors, the three groups are consistently arranged in the same order with respect to percentile records, average, and limiting scores. The Students have the fewest errors and the quickest time, the College Maids are intermediate and the Reformatory Women have the slowest time and the largest number of corrective movements to their credit (See Table 70).

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[1] We were aided in the testing of the two latter groups by Elizabeth Thelberg and Helen Curley, students in one of the advanced psychology courses at Vassar College.

TABLE 70.

PERCENTILES, AVERAGES AND RANGE OF TIME SCORES IN SECONDS, ERRORS AND PRECISION. TRACING STAR IN MIRROR.

| | | College Students | | College Maids | | Total Reformatory Group | |
|---|---|---|---|---|---|---|---|
| | | Star I | Star V | Star I | Star V | Star I | Star V |
| Time Scores in Seconds | 25th | 41.0 | 17.5 | 54.0 | 29.5 | 203.6 | 80.0 |
| | Median | 66.0 | 28.7 | 127.5 | 44.5 | 420.0 | 117.2 |
| | 75th | 110.0 | 39.0 | 161.0 | 69.0 | 627.0 | 148.0 |
| | Average | 82.6 | 31.3 | 133.6 | 48.6 | 473.1 | 124.0 |
| | Upper Limit | 18.0 | 7.0 | 36.0 | 21.0 | 58.8 | 36.0 |
| | Lower Limit | 252.0 | 76.0 | 409.0 | 85.0 | 2072.0 | 436.0 (two failures in addition) |
| Errors | 25th | 30 | 22 | 28 | 23–24 | 72 | 33 |
| | Median | 43–44 | 25 | 54 | 32–33 | 163 | 50 |
| | 75th | 53–54 | 31 | 81 | 43 | 282 | 70 |
| | Average | 46.8 | 27.3 | 58.1 | 34. | 204.6 | 58.0 |
| | Range Data | 17–125 | 17–54 | 23–126 | 17–52 | 38–910 | 22–437 |
| Precision in Centimeters | 25th | No data | 2.1 | No data | 6.6 | No data | 0 |
| | Median | | 7.5 | | 11.5 | | 0 |
| | 75th | | 14.8 | | 22.1 | | 0 |
| | Average | | 8.85 | | 14.5 | | 4.1 |
| | Upper Limit | | 0 | | 2.6 | | 0 |
| | Lower Limit | | 26.0 | | 29.2 | | 40.8 |

Table 71 shows a good correspondence between the average time and errors for the tracing and the classification of the inmates made by the institution into three groups depending upon outlook for reformation. The three groups differ more on the first than on the fifth star. This does not mean that the rate of acquisition of skill is greater for the poorer group than for the better group, but rather that the former are slower to adapt to the requirements of the test and require a longer time and more corrective movements to reach approximately the

same degree of skill. It is interesting to note, however, that even the less promising group do learn in the end to trace a fairly satisfactory star. The average deviations for these groups have not been calculated. The limiting records are fairly wide, but the distribution of their scores is normal and the average is representative of the majority in each group.

TABLE 71.

SCORES IN THE STAR TEST FOR THREE GROUPS OF BEDFORD REFORMATORY WOMEN.

| Institutional Classification | First Star | | Fifth Star | |
|---|---|---|---|---|
| | Time | Errors | Time | Errors |
| Most capable and promising. | 320.9 | 117.7 | 105.4 | 36.0 |
| Women with illegitimate children under 2 years of age. | 562.9 | 211.3 | 123.1 | 45.6 |
| Backward and mentally feeble. Unpromising. | 610.5 | 264.4 | 127.2 | 55.1 |

We were surprised at first to note that while the College Students worked more rapidly and with fewer corrective movements, their fifth star was obviously less precisely drawn than the fifth star of over seventy-five per cent. of the Reformatory Women. A comparison of the three groups on the basis of time and error alone seemed thus to neglect one important difference, so that we added precision as a third measurement. Precision was determined as follows: An aperture 2 millimeters wide and the length of one side of each point of the star, *i. e.*, 3.4 centimeters, was cut from a piece of millimeter paper. This opening was placed over each side of the six points of the star in turn, so that the red line of the star lay directly through the middle of the long axis of the aperture. The number of millimeters was then counted, wherein for a distance of three or more consecutive millimeters the tracing line made by the subject neither crossed the red line nor came within a range of one millimeter on either side of it, *i. e.*, within the space uncovered by the opening. The distances so obtained for each of the twelve sides of the star were then added together

and expressed in centimeters. These records are tabulated in Table 70. By adding to the average time and error scores of the three groups the proportionate amount of additional time and corrective movements necessary to secure absolute precision, the records still leave the three groups in the same order of skill as before, College Students first, College Maids intermediate and the Reformatory Women last. This method, however, when applied to individual records, gives a more homogeneous and a fairer basis of comparison than does time or errors, uncorrected by the successfulness of the resultant tracing.

As pointed out above, in connection with the Hard Directions test, this test suggests that the Reformatory group lends itself better to monotonous unerringly exact work of the type of factory operations, whereas the College Girl is better fitted for tasks where a reasonable degree of success is demanded, under conditions where rapid adaptation to constantly changing problems is essential. In using this test for clinical purposes, then, very painstaking procedure on the part of the subject is not always the better sign, if secured only at decided cost of time and errors. Especially is this true if one is looking for higher types of adaptation and skill, where a reasonable degree of accomplishment in a minimum of time is for most purposes more useful than more prolonged struggle for some higher degree of perfection.

As noted above, this test isolates better than any we have tried at Bedford those who are incapable of sustained effort under difficulties. It isolates, of course, the extremely low-grade feeble-minded, who, no matter how hard they try, cannot succeed in tracing a precise star. The epileptics have a characteristically bad time and their stars are all knotted up with "blind spots" where they are caught and held indefinitely. There were not enough of this type to generalize in this respect, but it was unquestionably true of all whom we tested. Chiefly, however, is the test of interest in the case of those who are clever enough but too unstable to trace the star well. These are invariably the girls who are difficult to manage in the institution. The tracing goes well enough until suddenly, at a hard point, the pencil starts, and persists upon going, in the

wrong direction. The subject then tugs and pulls, grows more and more irritated, disturbed and excited, makes big black circles and unprofitable markings, soon loses all control of herself and finally throws down the pencil and gives up. When calmed, praised and urged, she will continue and, in the end, usually draws a fairly good fifth star. No other test has so uniformly and conspicuously precipitated this state of instability on the part of the more excitable inmates, who work well as long as they meet with easy success, but who have not reserve force or stability in the face of a difficult situation which demands of them patience and perseverance. Their behavior in tracing these stars is surprisingly typical of their behavior in the institution where, when discipline, or the duties for which they are responsible, become the least pressing or demanding, they lose all control of themselves. Some such test as this is very essential in a clearing house which is to advise with reference to the wisest disposal and the treatment of court cases. Tests like Easy Opposites, Cancellation of Letters, etc., are for the most part too easy for this unstable type (who are frequently not dull), and thus fail to bring out the instability.

Other things being equal, had every member of each group tried equally hard to be exact and to work with all possible speed, those with most skill would have attained a given degree of precision presumably in less time, surely with less need for corrective movements, than the less skillful. If a rank of 1 was given in each case to the subject who had greatest precision, the quickest time and the fewest errors, one might expect a positive correlation between time, errors and precision. If, on the other hand, some tried and others were careless and hurried, those who were most precise would require the longest time and there would be a negative correlation. The latter is more largely true of the Student group, of whom two-thirds of those who constitute the quickest 50 per cent. were the least precise and for whom there is a negative correlation of —.50 between time and precision. Apparently, the other third tried to work slowly enough to trace an accurate star. The Reformatory Group, consisting as it does of some proportion of epileptics, low-grade feeble-minded and unstable individ-

uals, is also unhomogeneous in its method of attack and successes. There is, however, a positive correlation of +.57 between errors and precision for those who were bright enough to complete at least the 5th B Grade upon leaving school. The correlations calculated are given in Table 72. That between time and errors is plus for all groups.

TABLE 72.

CORRELATIONS FOR 5TH STAR.* TRACING STAR IN MIRROR.

| Groups | Time and Errors | Time and Precision | Errors and Precision |
|---|---|---|---|
| Bedford subjects who had completed at least 5B upon leaving school. | r equals +.52<br>P.E. " .10 | r equals +.18<br>P.E. " .14 | r equals +.57<br>P.E. " .10 |
| Bedford subjects who had completed less than 5B upon leaving school. | r equals +.81<br>P.E. " .07 | r equals —.10<br>P.E. " .19 | r equals +.10<br>P.E. " .19 |
| Total Reformatory Group. | r equals +.61<br>P.E. " .05 | r equals +.06<br>P.E. " .09 | r equals +.41<br>P.E. " .07 |
| College Students | r equals +.63<br>P.E. " .07 | r equals —.50<br>P.E. " .09 | r equals —.24<br>P.E. " .11 |
| College Maids | r equals +.87<br>P.E. " .04 | r equals —.11<br>P.E. " .18 | r equals —.28<br>P.E. " .16 |

* Least time, fewest errors, most precise tracing, each given rank of 1.

## CHAPTER V.

### Social, Industrial and Physical Records

School, home and industrial histories of the Bedford 88 and the College Maids, so far as the facts are available, are summarized in Tables 73 to 76. The medical records are tabulated in Chart A. These data have been so arranged that they may be easily compared with the statistics being formulated for the Standard Group of Cincinnati working girls by the Bureau of Vocational Guidance. To this end the records begin with the age at which the Reformatory women and the College Maids leave school and the tables outline the histories of the Below-Grade Group and each grade of the Grade Group separately. These tables and Chart A are to be found in the appendix. The data there presented are as follows:

TABLE 73.

(1) Age at leaving school.
(2) Alleged reason for leaving.
(3) Age when first went to work.
(4) Number of jobs held during the first three years.
(5) Total number of weeks of work record.
(6) Average wage per week.
(7) Amount of wage given to parent.
(8) The reason for leaving each job.

TABLE 74.

(1) Age at reception.
(2) Offense for which committed.
(3) Previous criminal institution records.
(4) Previous non-criminal institution records.

TABLE 75.

(1) Father's occupation.
(2) Mother's occupation.
(3) Inmate's age when father or mother died.
(4) Inmate's age when father or mother remarried
(5) Number of brothers and sisters.

TABLE 76.

(1) Nationality.
(2) Number of years in America.
(3) Married or single.
(4) Number of legitimate and illegitimate children.
(5) Religion.

CHARTS A AND B.

Medical record.

In Table 77 may be found the distribution, among the various grades which were completed upon leaving school, of (1) The Bedford 88, (2) the College Maids, (3) the combined group of public and Catholic school working girls who were tested at fourteen, (4) those who were retested at the end of the first year of industrial experience, (5) the girls who left the public school at 14, and (6) those of the latter who were retested a year later.

Each percentile record of the grade from which the Bedford 88 left school registers them one or more grades behind the College Maids. Only 10 per cent. of the College Maids, while 38.6 per cent. of the Reformatory women failed to complete 5B, the minimum amount of schooling required by law of the children of Cincinnati before they were permitted to secure working papers. Of the C.14 children, who went to work at fourteen from the *public* school, 41 per cent. have completed the 7th or the 8th grade, *i. e.*, are unretarded. Of those who are still at work a year later and are available for re-testing 39 per cent. were unretarded. Such a group of working women as the College Maids prove to have been drawn largely from the ranks of the more intelligent group of children leaving school since of them 55 per cent. had finished either the 7th or 8th grades. As a matter of fact, 35 per cent. had completed the 8th grade, whereas only 14 per cent. of the C.15 group had completed this grade. Of the Reformatory group but 33 per cent. were unretarded.

It should be noted, in passing, that the larger proportion of the Bedford 88 left from some grade lower than 5B, or from the 6th and 7th grades than from the 5th or 8th grade. The same relation appears in an exaggerated form for a later series

## TABLE 77

DISTRIBUTION AMONG SCHOOL GRADES.

| | Bedford 88 | | Maids | | Cincinnati Public and Catholic Together | | | | Cincinnati Public Alone | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | C. 14 | | C. 15 | | C. 14 | | C. 15 | |
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| VIII. (8B completed or more.) | 13 | 14.8 | 7 | 35. | 61 | 18.3 | 49 | 17.2 | 27 | 16.0 | 20 | 14.0 |
| VII. (7B completed but not higher than in 8B.) | 16 | 18.2 | 4 | 20. | 98 | 29.4 | 86 | 30.2 | 43 | 25.0 | 36 | 25.0 |
| VI. (6B completed, but not higher than in 7B.) | 16 | 18.2 | 4 | 20. | 102 | 30.6 | 90 | 31.6 | 59 | 34.0 | 53 | 36.0 |
| V. (5B completed, but not higher than in 6B.) | 9 | 10.2 | 3 | 15. | 69 | 20.7 | 60 | 21.0 | 43 | 25.0 | 36 | 25.0 |
| Total | 54 | 61.4 | 18 | 90. | 330 | 100. | 285 | 100. | 172 | 100. | 145 | 100. |
| Below-Grade (not higher than in 5B.) | 34 | 38.6 | 2 | 10. | | | | | | | | |

| | Bedford 88 | Maids |
|---|---|---|
| 25th Percentile | 7B | 8B |
| Median | 6B | 7B |
| 75th Percentile | 4B | 6A–6B |

of 200 women who were sentenced to Bedford. It may be that some explanation for this will be forthcoming at the end of the five years' investigation of the working girls by the Bureau of Vocational Guidance.

The age at which the College Maids and the Bedford 88 left school is given in the last two columns of Table 78. The table also distributes the Reformatory women who left school at a given age among the grades they had completed.

TABLE 78.

AGE AT WHICH THE BEDFORD 88 AND THE COLLEGE MAIDS LEFT SCHOOL.

| Age at Leaving School | VIII | VII | VI | V | Below-Grade Group | Bedford 88 | College Maids |
|---|---|---|---|---|---|---|---|
| Never went to school at all | | | | | 8 | 8 | |
| 11 | | | | | 2 | 2 | |
| 12 | 1 | 1 | 1 | 1 | 2 | 6 | |
| 13 | | 2 | 1 | 2 | 8 | 13 | 2 |
| 14 | 6 | 6 | 7 | 3 | 11 | 33 | 8 |
| 15 | 1 | 4 | 4 | 1 | 1 | 11 | 4 |
| 16 | 3 | 2 | 1 | 1 | 1 | 8 | 4 |
| 17 | 2 | | 2 | 1 | | 5 | 1* |
| 18 | | | | | | | 1* |
| 19 | | 1 | | | | 1 | |
| Unknown | | | | | 1 | 1 | |
| Total | 13 | 16 | 16 | 9 | 34 | 88 | |
| 25th Percentile | 14 | 14 | 14 | 13.5 | 11 | 14 | 14 |
| Median | 14 | 14 | 14 | 14 | 13 | 14 | 15 |
| 75th Percentile | 16 | 15 | 15 | 14.5 | 14 | 15 | 16 |

Average age at which maids left school 15.85.

* Both High School.

Except the oldest quarter of the 8th grade, who are older because there are included among them several who went into the high school and business college, the age at which the Reformatory women left school is the same for the 6th, 7th and 8th grades at the three percentiles. Those who completed only 5B, or who left school before completing this grade, are slightly younger than the others. There is little in their personal histories, however, except among the foreign-born girls,

to indicate that many of them were obliged to leave school for any reason other than the limitations of their capacity to learn. The presumption is that the school work became difficult for them earlier than for the others. The median and 75th percentile indicate that the maids, on the other hand, remained in school until they were one year older than were the Reformatory women. They had also gone one grade further. Here, again, the presumption that they stayed in school longer because they had more ability to learn is more likely than that they attained a more advanced grade because they had opportunity to remain longer in school. Studies in retardation show that children who leave school early do so chiefly because the work is beyond them, not because of economic necessity, etc.

One of the most convincing marks of difference between the College Maids and a considerable proportion of the Reformatory women is the contrast between their respective reasons for leaving school (Tables 73 and 73 M). The maids discuss the matter quite simply and naturally. In three cases only was school actively disliked. Of these, two left German Catholic schools from the 5th and 6th grades, and were obviously not the type who would enjoy stringent discipline. All of the maids left school because they were convinced that they would like work better. None ceased to be absorbed in their work and but one regrets that she did not stay longer in school. In no case were the parents eager to have the girl leave school. In only one instance was it really necessary for her to do so. A few of the maids who work at Vassar do so to earn money with which to secure training in domestic science, or as preparatory to entering some hospital for a nurses' training course. There were two such among those whom we tested. These seldom remain at Vassar longer than two or three years, and everything points to the fact that they are brighter and more efficient than the average maid. Not only are they more ambitious, but they have more initiative and greater ability than the others. It is probable that the cleverer and more able ones of the working children, too, will not be found in domestic positions five years from the time they leave school. The maids who are content to continue on at the college are energetic, stable women

of good judgment who have found the type of work which they can do well and which they enjoy. It is not surprising that they do not greatly surpass the median records of the C.15 in the mental tests. If they did, they, too, would have sought occupations where larger intelligence is rewarded, such as nursing, housekeeper's positions, hotel management, etc. Their reasons for leaving school may be summarized as follows:

9 Liked school but thought they would like work better; no case had to work.

3 Didn't like school; preferred to work.

1 Nervous trouble.

1 Had to support mother and self after father's death.

1 Thought she ought to help support herself; father was an officer in the army and went to the Philippine War.

1 Thought she ought to help support herself because her father had died.

1 High school was too far from her home in the country and she could not not afford to board in the town.

2 To earn money to take hospital training to become a nurse.

1 A Scotch girl who says it is the custom for girls of the class of society to which she belonged to quit school at 14 and go to work.

The reasons given by the Reformatory women, on the other hand, are such as these: "because I hated it," "because I couldn't learn," "because I quarreled with the teacher," "because I got to running around," and one gave as her reason, "because I had a miscarriage in school." Some left because they were needed at home or because they "wanted to go to work," but when their efforts at being helpful at home or their work histories are followed up, it seems that they failed to be responsible there, too, and liked their work as little as they had liked school. The better type of foreign girl alone appreciates the advantage of being able to read and write at least fairly well or expresses a desire to be taught. That the public school has not been meeting the problem of the retarded child is evident from the fact instanced below, that nearly two-thirds of them are leaving school at fourteen with all desire for education destroyed. The characteristic dislike of school on the part of our women and their entire lack of regret that they know so little is further evidence. Under other conditions, such as those that maintain in the Reformatory school, for instance, even

those who are at first most supercilious and most rebellious about "going to school" soon come to say, "This is different, it's sensible. I don't mind this, you learn things." The difference consists chiefly in using what seem to them practical situations to think about and solve and in teaching them individually. All are not expected to learn a set amount in a given time. Instead, each is allowed all the time she requires to comprehend the "lesson" and "learn it," though each is kept as near as may be to her maximal rate of development. Their progress and interest, even with somewhat difficult arithmetical problems, is surprising. Special classes for defectives in the public schools are rapidly being provided. These are meeting the problem of the dull child to better purpose and will succeed in keeping her in school long enough to develop her sluggish resources further than has heretofore been possible. Chiefly, however, the gain will lie in avoiding the drive of regular classes where the slow child grows accustomed to never understanding clearly what anything is about. Such a habit is in itself demoralizing. In any case, the difficulty as it presents itself at Bedford is more often not so much that the women are unable to understand what simple every day situations demand or to foresee the consequences of their actions, as that they are very slow in appreciating the meaning of things, and have formed a habit of acting without stopping to think.

With respect to the reasons for which the working children of Cincinnati leave school, Dr. Woolley says: "The children who tell us that they would have preferred to stay in school are a minority. Most of them are quite frank in saying that they are quite tired of school and anxious to leave it. The dissatisfaction is doubtless in part restlessness and desire for change, adventure, and independence, characteristic of the age of puberty, but perhaps an even more potent factor is the large amount of retardation among working children. Two-thirds of the children leaving our *public* schools are the failures—and like the rest of humanity, they are tired of doing the things in which they fail."[1] "The final estimate was that 73 per cent.

[1] "Facts about the Working Children of Cincinnati and Their Bearing upon Educational Problems," Helen T. Woolley. *The Elementary School Teacher*, Vol. XIV., Nos. 2–3, Oct.–Nov., 1913, p. 135.

of the families did not need the child's earnings, while 27 per cent. did."[1] These figures include both boys and girls.

How large a part is played by the kind of home and the attitude and character of the parents, it is not possible to say with any finality from the data at hand. The homes and parents of the working girls who have reached the eighth grade at fourteen appear to be of rather a better type than those of the children who have reached only the fifth grade at this age. These differences will doubtless be described and analyzed with greater exactness by the Bureau of Vocational Guidance. Meantime, we quote from their record cards certain instances typical of the larger proportion of each group.

*Eighth-Grade Records.*

1. Father dead. Home comfortable and wholesome and very attractive for a tenement. The mother is fond of her children, has washed for a living, and does her best for them. She is ignorant, but kind. The girl sews very well.

2. The child's own father divorced. The mother a real companion to her children. She is cheerful and the stepfather is thrifty. Both are ignorant, but ambitious for the children. The girl expects to study stenography in the spring.

3. Home comfortable, cheerful and attractive. Thrifty parents, who are fairly intelligent. The father thinks that, since the girl can't earn more than $3 a week, she would do better to stay home and help her mother.

4. The father works in a furniture store; the mother is a dressmaker. They are good, thrifty people and are buying their own home. They are strict with the children.

5. The mother is a cheerful, pleasant, calm woman. Both parents are alert to the interests of their children and the movements of the times. They are planning and ambitious for the children. The child only worked for the summer and is back in the first grade of the high school this fall.

*Fifth-Grade Records.*

1. Badly overcrowded home. Mother very ignorant, but shows some sense and the home is as comfortable as conditions will allow. The father works in a paper-house; the mother at tailoring.

2. The father deserted; the mother works irregularly. Poor, unattractive home. The mother has few thoughts beyond the struggle for existence.

3. Father deserted; mother helps in a restaurant. Unattractive home surroundings, probably due to poverty. The girl has sore eyes.

4. The mother reports the girl has always "lived like a baby" and does not like to work, so she has gone to live with an aunt in Richmond.

5. The mother thinks the girl unruly; the girl found work unsatisfactory. The mother has a good home for the girl and is willing to let her entertain her company there. The girl prefers to go elsewhere.

6. The father is a butcher. The right atmosphere in the home, but very poor and they have had bad control of the girl. The girl is superficial and unappreciative of the mother.

7. Poor, dilapidated home and out-buildings. Mother hysterical, probably quick-tempered and weak. Father probably feeble-minded.

[1] *Ibid.* p. 135.

8. Father alcoholic. Father and mother disagree and the home is broken up.
9. Child has gone away with a company of trapeze performers. Lives in hotels and the mother seems well pleased with these opportunities for her.
10. Poorly ventilated and not very homelike.
11. Interior conditions poor. One daughter "went wrong." Mother tries, but does not know how to manage and control her children.

There are other records for this group in which the homes are comfortable and the parents intelligent, but the above are in the majority. There are some among them that read not unlike the early records of the Reformatory group and point to a beginning of criminal careers. There are in both groups a number of instances in which one or both of the parents have deserted or died. This is a conspicuous factor in the social condition of the Reformatory women. The exact proportion of such cases among working children is not at hand, but the fact of its frequency is evident from even a cursory reading of their records. Here, again, it is a matter for question whether loss of the parent is the cause of the child's leaving school and going to work early, and of the ultimate unsocial conduct in the case of the Bedford 88, or, whether loss of parent, retardation, misconduct, etc., are not for the most part but manifestations of the same thing—irresponsibility, mental, physical and social inferiority on the part of both parents and child. The facts at our disposal and eugenic investigations lead us to believe that the latter is in the larger measure true.

The condensed individual histories of the Reformatory women speak for themselves in contrast with those of the College Maids. (Compare Tables 73, 73 continued, and 75-M.) The latter had been idle conspicuously little; the former considerably more than the table would indicate. Table 79 gives the number of weeks that positions were held by the working children, who left the 8th and 5th grades respectively from the public and Catholic schools, during the first year of their working history. Sixty-two and five-tenths per cent. of those leaving the public school 8th grade and 48.7 per cent. of those leaving the public school 5th grade were employed through the entire 52 weeks; 66.7 per cent. of the 8th and 67.6 per cent. of the 5th grade public were employed not less than 48 weeks; while 75 per cent. of both were employed for at least 40 weeks.

This displays not a little stability. Too, it must not be overlooked that a number of the children who secured working papers worked only for the summer and then returned to school in the fall. In such instances a minimal work record is far from being a sign of instability.

Almost without exception, the Maids worked continuously during their first year. Although the long summer vacation which is enforced by the college would permit at least that much idleness or wandering about in quest of fun and excitement, all but three of them engaged positions ahead as waitresses in summer resorts in Connecticut and worked all summer. Moreover, they go back summer after summer to the same place. All who can stay at the college during the summer do so—a thing which they would not be apt to do if they were of a restless type and eager for change. Some of the girls, when younger, went home for the summers, because their parents wished them to do so. For them, this is the more wholesome, normal thing to do.

TABLE 79.

STANDARD GROUP. WORK RECORDS

| Number of weeks employed during first year of working history | Cincinnati VIII-Grade Girls | | | | Cincinnati V-Grade Girls | | | |
|---|---|---|---|---|---|---|---|---|
| | Public | | Catholic | | Public | | Catholic | |
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| 52 | 15 | 62.50 | 17 | 54.83 | 18 | 48.65 | 9 | 34.61 |
| 48–51 | 1 | 4.17 | 6 | 19.35 | 7 | 18.92 | 5 | 19.23 |
| 44–47 | | | | | 2 | 5.41 | 4 | 15.38 |
| 40–43 | 2 | 8.33 | 1 | 3.23 | 1 | 2.70 | | |
| 36–39 | 2 | 8.33 | 3 | 9.67 | 1 | 2.70 | 2 | 7.69 |
| 32–35 | 1 | 4.17 | | | 1 | 2.70 | | |
| 28–31 | 1 | 4.17 | 1 | 3.23 | 2 | 5.41 | 1 | 3.85 |
| 24–27 | | | | | | | 3 | 11.54 |
| 20–23 | | | 1 | 3.23 | 1 | 2.70 | 1 | 3.85 |
| 16–19 | | | 1 | 3.23 | 1 | 2.70 | | |
| 12–15 | 2 | 8.33 | 1 | 3.23 | 2 | 5.41 | | |
| 8–11 | | | | | 1 | 2.70 | 1 | 3.85 |
| Totals | 24 | | 31 | | 37 | | 26 | |

Of the Reformatory women, eight have never worked at all, seventeen less than a year, twenty-three less than two years and only nineteen all of the first three years of their industrial history. As stated above, these figures greatly exaggerate the time they really did work and give the group the benefit of the doubt. It is the Below-Grade and 5th-Grade Groups that report having worked most continuously. They constitute eleven of the nineteen who reported having worked the entire three years and eleven of the seventeen who reported having worked not all of three years, but more than two. There is an undoubted tendency for the duller girls to work more steadily —especially the foreign ones, who are rigorously under the domination of parents who exact and appropriate their wages. Then, too, they are slower to appreciate ways of escape from the routine of factory and domestic work. Moreover, they go to work at an earlier age and are less apt to be exploited for purposes of prostitution on account of their extreme youth. However, they have by no manner of means worked as continuously as they maintain; only they are too dull to remember the breaks between jobs or to estimate the time they have been idle. For a more recent series of two hundred subjects, whose families a member of the staff has been able to visit, the parents report more idleness and a larger number of different jobs held.

TABLE 80.

WORK RECORD—BEDFORD 88.

| Number of weeks employed during first three years of working history. | Bedford 88 | |
|---|---|---|
| | No. | Per Cent. |
| None at all | 8 | 9.1 |
| Less than 52 weeks | 17 | 19.3 |
| 52–103 weeks | 23 | 26.1 |
| 104–155 weeks | 17 | 19.3 |
| 156 weeks | 19 | 21.6 |
| Facts unknown* | 4 | 4.5 |

The number of positions reported by the Reformatory women during the first three years of their working history varies also from the actual number. Some have forgotten. Some are too

* All too feeble-minded to give necessary data.

feeble-minded to recall the exact number. The majority cannot be incited to consider the matter of sufficient importance to think hard enough to recount all of those jobs which they held for no longer than a day or a few weeks. "What is the use?" or "I cannot remember" is the only response one gets for a painstaking explanation of why all the jobs should be accounted for. Apparently, it actually requires more concentration and calculation than they are equal to.

TABLE 81.

NUMBER POSITIONS HELD FIRST YEAR—STANDARD GROUP.

| Cases | Cincinnati VIII-Grade Girls | | | | Cincinnati V-Grade Girls | | | |
|---|---|---|---|---|---|---|---|---|
| | Public | | Catholic | | Public | | Catholic | |
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| 1 | 14 | 58.34 | 18 | 58.05 | 16 | 43.24 | 6 | 23.07 |
| 2 | 5 | 20.83 | 10 | 32.26 | 8 | 21.62 | 8 | 30.77 |
| 3 | 3 | 12.50 | 3 | 9.68 | 8 | 21.62 | 3 | 11.54 |
| 4 | 2 | 8.33 | | | 4 | 10.81 | 3 | 11.54 |
| 5 | | | | | 1 | 2.70 | 3 | 11.54 |
| 6 | | | | | | | 2 | 7.69 |
| 7 | | | | | | | 1 | 3.85 |
| Totals | 24 | | 31 | | 37 | | 26 | |

TABLE 82.

NUMBER INDUSTRIES ENTERED FIRST YEAR—STANDARD GROUP.

| Cases | Cincinnati VIII-Grade Girls | | | | Cincinnati V-Grade Girls | | | |
|---|---|---|---|---|---|---|---|---|
| | Public | | Catholic | | Public | | Catholic | |
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| 1 | 16 | 66.67 | 22 | 70.96 | 19 | 51.35 | 8 | 30.77 |
| 2 | 5 | 20.83 | 9 | 29.04 | 13 | 35.14 | 8 | 30.77 |
| 3 | 3 | 12.50 | | | 4 | 10.81 | 7 | 26.92 |
| 4 | | | | | 1 | 2.70 | 1 | 3.85 |
| 5 | | | | | | | 2 | 7.69 |
| Totals | 24 | | 31 | | 37 | | 26 | |

The 8th grade working girls are evidently more stable than the 5th. A higher per cent. of them have worked the entire fifty-two weeks of the year; they have changed their jobs less frequently and have entered fewer kinds of industries than have the latter. The persistency with which the maids have clung to one type of industry is still more marked and the infrequency with which they have changed their positions is too obvious to need comment. (See Table 73-M.) The fact that the long summer vacations enforce at least one extra occupation renders an enumeration of the number of positions held and the number of industries entered misleading. For this reason we have not tabulated them.

TABLE 83.

WEEKLY WAGE EARNED FIRST YEAR—STANDARD GROUP.

| Wage | Cincinnati VIII-Grade Girls | | | | Cincinnati V-Grade Girls | | | |
|---|---|---|---|---|---|---|---|---|
| | Public | | Catholic | | Public | | Catholic | |
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| 0– .99 dollars | | | | | | | | |
| 1–1.49 " | | | 1 | 3.23 | | | | |
| 1.50–1.99 " | | | | | | | 1 | 3.85 |
| 2.00–2.49 " | 5 | 20.83 | 6 | 19.35 | 6 | 16.21 | 4 | 15.37 |
| 2.50–2.99 " | 11 | 45.83 | 7 | 22.58 | 15 | 40.53 | 8 | 30.77 |
| 3.00–3.49 " | 2 | 8.33 | 6 | 19.35 | 10 | 27.03 | 8 | 30.77 |
| 3.50–3.99 " | 1 | 4.17 | 4 | 12.91 | 4 | 10.81 | 3 | 11.54 |
| 4.00–4.49 " | 3 | 12.50 | 3 | 9.67 | 2 | 5.40 | 1 | 3.85 |
| 4.50–4.99 " | 1 | 4.17 | 2 | 6.45 | | | | |
| 5.00–5.49 " | 1 | 4.17 | | | | | 1 | 3.85 |
| 5.50–5.99 " | | | 1 | 3.23 | | | | |
| 6.00– " | | | 1 | 3.23 | | | | |
| Totals | 24 | | 31 | | 37 | | 26 | |
| Averages | 3.15 | | 3.25 | | 2.94 | | 3.03 | |

Clearly, in the matter of wages the Reformatory women were not at a disadvantage. It seems likely that the sums reported are not very far from the true amount received for the type of work in question. The factory wages of the Reformatory

women have been distinctly better than those of the working children, though this difference may be equalized in the end by the fact that living costs more in New York City.

The most fundamental point of departure of one group from the other is in the matter of the reasons given by each for leaving one job for another. The Maids have not left one position without another in view, unless it was unavoidable. They rarely changed without a reason that would seem a good one to a sensible person. One of the characteristic things about their attitude has been a refusal to change work, even for better pay, if the environment of the new job was undesirable or demoralizing. Year after year, as already stated, they have gone to the same resorts as waitresses in the summer. When they were asked why they did not go to southern resorts for a change, their reply was, "We like Connecticut better. Nice plain people come there and take it for granted that you want to be good." It is not that they do not feel the desire for adventure, but their judgment tells them it is better not to change their positions, go south, etc., and they abide by it. They appreciate that socially it is superficially a gain to be a shop-girl instead of a maid, "But," they point out, "the wages are insufficient to live on; one can save nothing, the work is harder, and one must constantly meet demands to be immoral." They prefer their present work because the hours are regular, the living fair, and because they enjoy the community life and the privilege of the maids' club-house. This is true at least of those whom we tested and to whom we talked, who represent doubtless the better sixty per cent. of the help at the college.

They are conspicuously taller than our subjects and carry themselves better. They have their eyes and teeth cared for. They dress quietly. Many of them can sew and speak with pride of the dresses they have made. They are stable, unaffected, straightforward and dignified. They have very fair appreciation of the value of their services to others and of the money they earn, and the majority save some proportion of their wages. They like their work in spite of a realization of its limitations. They imitate the students very little, and whereas they might envy them, they seem rather to enjoy them. They respect their

work and themselves and are happy, healthy and self contained. Indeed, they are more sensible in their decisions and more secure in their conduct than we expected of working women of today.

Of the working children's reasons for leaving their jobs, Dr. Woolley writes: "A study of the reasons assigned in these hundred cases showed that forty-one per cent. were included under economic reasons. In sixty per cent. of these the child had voluntarily left because the pay was low or because a better position was offered him or because he wanted to learn a trade. In the remaining cases the employer had either laid the child off or reduced his earnings because of slack season. The extra largest group of reasons, 21 per cent., was that of dissatisfaction on the part of the child for reasons other than economic, such as work too dirty, workroom too noisy, could not bear the smell of paste, fellow employees too rough, afraid of lead poisoning, foreman cross and 'hollered' at him, or unjustly charged with spoiled materials. Physical reasons, such as illness or work which proved to be too hard physically, account for eleven per cent. of the changes. This same proportion is due to failures on the part of the child, which the children themselves report almost as frequently as the employers. Disagreement with foreman or with fellow employees and incompetence make up the most of this group. Reasons connected with the home comprise nine per cent. of the whole number and conflicts with the child-labor law the remaining eight per cent."[3] Further analysis of the history of the children who continually leave their jobs because their work is a failure or because they do not like the work and fail to get along with their foreman, etc., may lead to the isolation among them of the type who is finally sentenced to a Reformatory.

In the condensed work histories of the Reformatory subjects much of the crudeness and the unseemliness of their conduct has been purposely omitted from the telling. The institution records of the personal histories of the majority of them are but reiterations of the wretched manner of living portrayed in vice

[3] Woolley, Helen Thompson, "Charting Childhood in Cincinnati"—*Survey*, Vol. XXX., No. 19, p. 605.

commission reports. Our design has been rather to indicate the major facts of their work histories—their lack of discrimination in the selection of work, their thoughtless, reckless manner of leaving jobs for trivial reasons, and, because their immorality and illegal conduct has so often played the major part in the interruption or conclusion of their industrial careers, certain of these facts have been included. Sometimes before leaving school quite universally not later than three years after leaving school, they have been sex offenders. Their previous court histories are given in Table 84.

TABLE 84.

| | No. | Per Cent. |
|---|---|---|
| No previous arrest | 36 | 40.0 |
| One previous arrest | 28 | 32.0 |
| Two previous arrests | 14 | 16.0 |
| Three previous arrests | 5 | 6.0 |
| Four previous arrests | 0 | 0.0 |
| Five or more previous arrests | 5 | 6.0 |

Had their families been visited, the facts with respect to the number of legitimate and illegitimate children would probably resemble those of a more recent one hundred inmates, in whose case careful investigations have been made. These facts are given in Table 85.[4]

TABLE 85.

| Number of Women out of 100 Who Have | | |
|---|---|---|
| One legitimate child | | 4 |
| One illegitimate child | 16 | |
| Two illegitimate children | 4 | |
| Five illegitimate children | 1 | |
| | | 21 |
| One miscarriage previous to entering | 14 | |
| Two miscarriages previous to entering | 3 | |
| One miscarriage since | 2 | |
| | | 19 |
| Pregnant on entering | | 8 |
| One child born since entrance | | 1 |

[4] "*Recommendations of the Laboratory of Social Hygiene for Disposition of First One Hundred Cases Studied.*" Published by the Bureau of Social Hygiene. 1914.

TABLE 86.

DISTRIBUTION OF OFFENSES FOR WHICH COMMITTED.

| Offense. | Below Vth Grade | | Vth & VIth Grades | | VIIth & VIIIth Grades | | Bedford 88 | |
|---|---|---|---|---|---|---|---|---|
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| Common Prostitute | 16 | 47. | 12 | 48. | 14 | 48.2 | 42 | 47.7 |
| Vagrancy | 9 | 26.4 | 3 | 12. | 7 | 24.1 | 19 | 21.5 |
| Petit Larceny | 5 | 14.7 | 1 | 4. | 1 | 3.5 | 7 | 8. |
| Associating with disorderly and vicious presons | 1 | 2.9 | 1 | 4. | 1 | 3.5 | 3 | 3.4 |
| Disorderly or ungovernable child | 2 | 5.9 | 2 | 8. | | | 4 | 4.5 |
| Grand Larceny, second degree | | | 1 | 4. | 1 | 3.4 | 2 | 2.3 |
| Disposing of Cocaine | | | 1 | 4. | 1 | 3.4 | 2 | 2.3 |
| Keeping a disorderly house | | | | | 2 | 6.9 | 2 | 2.3 |
| Disorderly conduct or person | | | | | 1 | 3.5 | 1 | 1.1 |
| Attempt to commit grand larceny, second degree | | | 1 | 4. | | | 1 | 1.1 |
| Habitual drunkard | | | 1 | 4. | | | 1 | 1.1 |
| Burglary, third degree | | | 1 | 4. | | | 1 | 1.1 |
| Grand larceny, first degree | | | | | 1 | 3.4 | 1 | 1.1 |
| Endangering health of minor | | | 1 | 4. | | | 1 | 1.1 |
| Adultery | 1 | 2.9 | | | | | 1 | 1.1 |
| | 34 | | 25 | | 29 | | 88 | |

Table 86 indicates the frequency of the offenses for which the Bedford 88 were committed. It indicates also the number and per cent. guilty of each offense who had finished the 7th and 8th grades, the 5th and 6th grades, and who belonged to the Below-Grade Group. Apparently it is the more intelligent group, the Grade Group, that is responsible for the more infrequent types of crime, grand larceny first and second degree, disposing of cocaine, keeping disorderly houses, burglary in the third degree, endangering the life of minors, and habitual drunkeness. The only exception to this is the one individual found guilty of adultery and the circumstances hardly justify the charge. It was the case of a feeble-minded girl who became pregnant by the husband of her mistress. She was told to say "yes" to all questions at her trial, which she did and so pleaded guilty to the charge of adultery.[5]

[5] It would be interesting to know what becomes of all the women who dispose of cocaine, keep disorderly houses, commit burglaries, etc. Are they regarded for the most part as irreformable and sentenced elsewhere or are they cleverer than the women committed to Bedford and do they better escape detection, arrest, or sentence?

The histories reveal that the offense as stated is not always indicative of the true circumstances out of which the arrest grew, that the crime for which one is convicted is a technical matter not to be trusted as representative of the character of the individual. Forty-two individuals or but fifty per cent. were arrested as common prostitutes, whereas the histories of the other fifty per cent. show that they also had been soliciting since an early age, that the specific offenses, vagrancy, larceny, etc., for which they were convicted were in the great majority of cases but incidents in a life of prostitution. Whereas the descriptive value of such legal terms as "Common Prostitute," "Vagrant," and "Disorderly Child" is quite unlike, the lives of the individuals so convicted differ little save in age and in some cases in the number of previous arrests. Of the 42 who were arrested as common prostitutes, 33 were older than 20.5 years, the median age of arrest. Of the 26 arrested as vagrants, disorderly children, associating with disorderly persons, one was just 20.5, one was older, and all the others younger than the median age. It may be indicated in passing that of the twelve arrested for larceny, nine are younger than the median age. The wonder has crossed our minds before whether the judge regards the younger girl who steals more worthy reformation than the one who solicits, or whether it is that they regard stealing as meriting a more severe punishment.

TABLE 87.

AGE OF THOSE COMMITTED FOR VARIOUS OFFENSES.

| | 20.5 Years and Under | Over 20.5 Years |
|---|---|---|
| Common Prostitute | 9 | 33 |
| Keeping a disorderly house | 0 | 2 |
| Vagrancy | 18 | 1 |
| Petit Larceny | 5 | 2 |
| Associating with disorderly and vicious persons | 3 | 0 |
| Disorderly or ungovernable child | 4 | 0 |
| Grand Larceny, second degree | 1 | 1 |
| Attempt to commit grand larceny, second degree | 1 | 0 |
| Disposing of cocaine | 0 | 2 |
| Disorderly conduct or person | 0 | 1 |
| Habitual drunkard | 0 | 1 |
| Burglary, third degree | 1 | 0 |
| Grand Larceny, first degree | 1 | 0 |
| Endangering health of minor | 0 | 1 |
| Adultery | 0 | 1 |
| | 43 | 45 |

In contrast with the maids, the Reformatory women in their accounts of their working history for the most part show little sense of the value of service or money and little foresight of ends or endeavor to achieve them. They are quite without forbearance and entirely childlike in their attitudes. They have had no definite aim, worthy or unworthy; they have been easily flattered and repeatedly led to do things which could not lead to the happiness and the good times which they sought, let alone to their welfare. They are egotistical and untruthful and lacking in any appreciation of social responsibility. Along with their lack of control and their wrong-doing, they sometimes possess a fair amount of formal knowledge with respect to what it is customary to consider right and wrong, but their ideas upon these subjects are chiefly verbal and very little a part of their character or of their motives for acting. Even the more intelligent use little judgment in the conduct of their lives, act quite uniformly without thinking and profit little by their mistakes.

There came a time when they were "too old to go to school," when they "wanted to go to work," or when they were "old enough to be their own boss." They gave no thought to what work they had best select or what wage they might expect to earn. Once at work, with an equal lack of reflection they left because of some trivial thing to which they took exception; or, without considering whether another job as good could be secured, they left simply because "someone told them that the pay was too small." In consequence they are often idle. They may leave to secure a better wage and straightway uncritically accept another job that pays no more than the first, simply because "a friend was there," or they thought they "would like it." Meantime, they are seldom without the need to be earning a wage. Again, it is characteristic of them that they go to the other extreme and accept any position which means more money irrespective of its desirability. When earning ten dollars in a respectable manicurist shop, they will go to work in a barber shop to earn two dollars a week more. Thus, they have drifted casually along and are at a loss to understand why we take seriously the matter of positions, how they were found, what they were, whether the work was interesting or the pay adequate.

Although many of them ended their industrial careers with "marriage," it was usually an inadvisable step. In many instances, the husband was alcoholic; he was seldom able or willing to support the girl. Sometimes, he had no other intention than to put her on the street to earn his support. In few cases was she unaware of the character of the man she was marrying, or need she have been, had she given the matter a little consideration. In those cases where the husband was in good standing and provided for his family, the girl soon grew tired of him and the home and after a year or two deserted to begin, or to go back to, a life of prostitution. "Marriage," then, as a "successful ending" to an industrial career, without some further analysis is no reason at all, inasmuch as those who thereafter deliberately desert their homes and their children or who unthinkingly enter into obviously undesirable unions are the rule among such a group as we are studying.

The writer has not attempted to evaluate the findings of the present physical condition and previous medical history of the women examined. The data itself is to be found in the Appendix in Charts A and B. The facts about each individual may be ascertained or the frequency of any particular disease, habit, etc. The blood tests for syphilis and gonorrhoea are summarized below in Table 88.

TABLE 88.

BLOOD TESTS FOR SYPHILIS AND GONORRHOEA.

Wassermann and Complement Fixation Test.

| Syphilis | Gonorrhoea | No. of Individuals | Per Cent. |
|---|---|---|---|
| Both Negative | | 13 | 13. |
| Both Positive | | 35 | 35. |
| Both Doubtful | | 1 | 1. |
| Negative | Doubtful | 15 | 15. |
| Doubtful | Negative | 1 | 1. |
| Positive | Doubtful | 6 | 6. |
| Doubtful | Positive | 2 | 2. |
| Negative | Positive | 23 | 23. |
| Positive | Negative | 4 | 4. |

| | |
|---|---|
| 45% Positive | 60% Positive |
| 4% Doubtful | 22% Doubtful |
| 51% Negative | 18% Negative |

The criminal woman seem to be stronger physically and much less often ill than the average individual. There are occasional cases of tonsilitis and sore throat, but in three years there has been no case of contagious disease and almost no serious operation. The inmates are sometimes received into the Institution in an anemic condition, with clinical symptoms of syphilis and gonorrhoea. There have been a number of cases of acute trachoma, iritis, keratitis and gonorrhoeal opthalmia. Some few have entered infected with tuberculosis, but these have always been straightway transferred.

At Bedford the women are out in all sorts of weather; in the winter they wear cotton dresses and short capes that are not overly heavy. They rarely wear anything over their heads even when their hair has been cut, yet they seldom have colds. Headaches and indigestion are rare. With an average daily population of 494.8 in the institution during the year that these subjects were admitted, there were only 93 patients in the Hospital during the twelve months. This number included 22 obstetrical cases and both the infants and the mothers were counted in the 93 patients. The number includes also, 15 other infants brought back from the Nursery to be specially cared for in the Hospital. There was one operation where the ovaries were removed and there were two deaths during the year, one of peritonitis and one of apoplexy due to syphilis. Indeed, they are apparently unusually robust as regards general health.

The record of the circumstances of their early sex offenses and its effect upon their later experience, and of their reasons for entering prostitution are meager, because their own accounts were quite as slight. Here, too, their attitude is casual, incidental and colorless for the most part. Their behavior seems largely a matter of thoughtlessness, of failure to appreciate social or personal reasons for acting otherwise, of circumstances uncritically reacted to in the beginning, and then of habit, rather than some unequal struggle with instinct and emotion. They lament being separated from the noise and the lights and the comradeship of the streets; they are restless and eager for the suppers and rides that occasionally fall to their lot. Some of the more intelligent among them have enjoyed the competi-

tion of the life of prostitution, but seldom is sex in itself referred to by them or apparently present consciously or otherwise as an impelling element in their desire to be "free." One could almost wish that it were possible to plead for them some unusual gift of emotion or impelling sex impulse to account for their behavior. Instead, their conduct is to be accounted for by mere lack of insight into, or appreciation of, its significance.

So it is we have found them—without foresight, uncomplex in their emotions and reactions, and uncritical toward experience of every sort. Some share of this condition is undoubtedly due to a lack of the kind of early academic and industrial training that might have developed them, though there was never a time when any considerable proportion of them had alert minds. With proper educational and vocational guidance two-thirds of them ought to build up fairly satisfactory habits of conduct. The remaining third, under permanent custodial care, have sufficient intelligence to become wholly self-supporting.

## CHAPTER VI.

### Summary and Conclusions.

At the expense of some repetition, the results of the application of the tests of the Cincinnati Bureau of Vocational Guidance at Bedford are summarized here. The most striking fact in the comparison of our subjects with this standard is the bimodal distribution of their scores as over against the unimodal one of the Working Girls. In practically all the tests the curves of the Bedford 88 fall from one mode at a point near the better end of the C. 14 and C. 15 curves, to rise again to form a second mode at the poorer end of the standard curves. The tests of Chapter IV, too, Reading, Writing, Direction Tests, etc., have added evidence that the Reformatory inmates constitute two pretty distinct groups with respect to their intelligence. At least such was true of the women committed to Bedford between 1911 and 1914. Why it should be so, and why the charges sent to such an institution do not follow a normal distribution curve as regards tests of their intelligence, it is difficult to say.

The bimodal distribution of the Bedford 88 instead of the unimodal distribution of the working girls may seem to the reader only the establishment of a roughly hewn fact and the comparison of their norms a prosaic task. It would seem much less prosaic had he started out under the conditions which confronted us some five years ago. There was the request of institution and court for some reliable basis for estimating the reformability of their charges, but there were practically no standards in mental tests either for the criminal woman or for the law-abiding woman of like industrial and economic standing. We have now measured the mentality of a representative group of women by a fairly large number of tests in a number of which the results have been checked in terms of a reliable set of norms—those for the working girl of Cincinnati. That the latter are younger than our subjects, that the work of comparison is only at its beginning, these and all other limitations do not alter our belief that good ground has been gained toward a working understanding of the mentality of the criminal woman. It is of considerable interest, then, to

note that one group of the Bedford 88 has clustered about the better end of the standard curve, and another group toward its poorer end.

To find a basis upon which the bimodal curves might be analysed into their two unimodal elements we have divided the Bedford 88 in many ways. The division which alone served to separate the better from the poorer subjects was that of the grade completed upon leaving school. Those who had accomplished the completion of at least 5B grade formed a curve which paralleled very closely that of the Cincinnati girl of fifteen, while those who had not succeeded in passing 5B comprised the majority of those who collected at the poorer mode of the Bedford 88 curves. Throughout, the grade completed has proved to be more often a measure of our subjects' ability to progress in school, less often a measure of their opportunity to attend school. We found that the women could not recall their age precisely in years and months on leaving school, so that we could only estimate as closely as we could the number of *years* that each was "going to school." When the grade completed was subtracted from the grade that should have been reached had one grade been passed for each year of school attendance, it became quite evident that the Below-Grade Group had progressed much more slowly in proportion to the gross number of years of schooling than had the Grade Group. The following figures give the number of years of retardation for this group and contrast them with those who had passed the 8th grade. The differences between their retardation and that of the 5th, 6th, and 7th grades is only slightly less.

| No. of Years Retardation | Below-Grade Group No. of Individuals | 8th Grade No. of Individuals |
|---|---|---|
| Seven | 3 | 0 |
| Six | 1 | 0 |
| Five | 6 | 0 |
| Four | 6 | 1 |
| Three and a half | 3 | 0 |
| Three | 2 | 0 |
| Two and a half | 1 | 1 |
| Two | 2 | 2 |
| One and a half | 1 | 0 |
| One | 0 | 4 |
| Zero | 0 | 5 |
| Unknown | 1 | 0 |
| Never went to school* | 8 | 0 |
| | 34 | 13 |

*For the most part these eight were not more than six, seven and eight years old mentally.

Any correlation which has proved to exist between the better records in the mental and physical tests and the greater mental capacity of our subjects, as indicated by the completion of the higher school grades, cannot be reduced to differences in the age of the women when tested: at least if there is any such correlation between age and record in the tests, it has had an equal chance to manifest itself in each grade. As a matter of fact, the actual correlation between age (the oldest was given a rank of one) and rank in two of the more important tests—easy opposites arranged in order of accuracy and time, and index of card sorting—is only + .13; P.E. = .074 and — .066; P.E. = .0079 respectively.

The average age at entrance of the 208 commitments of the fiscal year 1912–1913 is 21 years, 9.5 months. At the time of testing, the median age of the Bedford 88 was 20 years and 6 months, that of the College Maids exactly 21 years. The variations from the average and the per cent. at each age may be seen from the accompanying table of distribution of ages, under the columns headed Bedford 88 and Maids. This table includes also the distribution of these groups at their present ages among the several grades which they had completed upon leaving school.

TABLE 89

THE DISTRIBUTION OF AGE BY GRADE

| Age at Commitment | Below-Grade Group | | Vth Grade | | VIth Grade | | VIIth Grade | | VIIIth Grade | | Bedford 88 | | College Maids | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| 15–16 | 3 | 8.82 | 0 | | 2 | 12.50 | 1 | 6.25 | 1 | 7.69 | 7 | 7.95 | 1 | 5.00 |
| 17 | 4 | 11.76 | 0 | | 4 | 25.00 | 2 | 12.50 | 2 | 15.38 | 12 | 13.64 | 2 | 10.00 |
| 18 | 4 | 11.76 | 1 | 11.11 | 1 | 6.25 | 3 | 18.75 | 0 | | 9 | 10.24 | 2 | 10.00 |
| 19 | 2 | 5.88 | 0 | | 1 | 6.25 | 2 | 12.50 | 1 | 7.69 | 6 | 6.82 | 2 | 10.00 |
| 20 | 3 | 8.82 | 3 | 33.33 | 2 | 12.50 | 1 | 6.25 | 1 | 7.69 | 10 | 11.35 | 0 | |
| 21 | 3 | 8.82 | 1 | 11.11 | 0 | | 0 | | 1 | 7.69 | 5 | 5.68 | 4 | 20.00 |
| 22 | 4 | 11.76 | 2 | 22.22 | 0 | | 2 | 12.50 | 1 | 7.69 | 9 | 10.24 | 2 | 10.00 |
| 23 | 2 | 5.88 | 1 | 11.11 | 1 | 6.25 | 1 | 6.25 | 2 | 15.38 | 7 | 7.95 | 2 | 10.00 |
| 24 | 1 | 2.94 | 0 | | 0 | | 0 | | 1 | 7.69 | 2 | 2.27 | 1 | 5.00 |
| 25 | 3 | 8.82 | 0 | | 0 | | 1 | 6.25 | 1 | 7.69 | 5 | 5.68 | 1 | 5.00 |
| 26 | 0 | | 0 | | 4 | 25.00 | 0 | | 0 | | 4 | 4.54 | 0 | |
| 27 | 3 | 8.82 | 1 | 11.11 | 0 | | 2 | 12.50 | 0 | | 6 | 6.82 | 1 | 5.00 |
| 28 | 1 | 2.94 | 0 | | 0 | | 1 | 6.25 | 2 | 15.38 | 4 | 4.54 | 1 | 5.00 |
| 29 | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 1 | 5.00 |
| 30 | 1 | 2.94 | 0 | | 1 | 6.25 | 0 | | 0 | | 2 | 2.27 | 0 | |
| | 34 | | 9 | | 16 | | 16 | | 13 | | 88 | | 20 | |

The industrial and social history of twenty Maids was obtained, although only eighteen were given the mental tests.

## Summary.

*Height.* The Bedford 88 are shorter at all three percentiles than the working girl of fifteen. Their height sitting is shorter than the normal, but relatively less so in proportion to their height standing than is true of the normal woman. The Grade Group are taller than the Below-Grade Group at the three percentile points; they are taller than the working girl of fifteen at the 25th percentile, not at the median or 75th percentile.

*Weight.* The Bedford 88 are decidedly heavier than the working girl of fifteen. They are heavier, also, than the normal woman of corresponding age. Indeed, 70 per cent. of the Grade Group and 80 per cent. of the Below-Grade Group are heavier than the median weight for the normal individual of corresponding age.

*Grip.* The Grade Group is stronger in grip than the working girl of fifteen, as measured at the three percentile points, and with both the right and left hand. The Below-Grade Group is even more superior to them than is the Grade Group. However, neither Reformatory group has a grip equal to that of the normal individual of corresponding age.

Physical measurements of the College Maid were not secured, but the majority of them were unquestionably taller than the Reformatory group and not so heavy. Our descriptive account of them, with but three exceptions, contains the comment "slender and tall."

To the anthropometric records of the Bedford 88, we have added measurements in height, sitting and standing, weight, and grip, right and left hand, of another 118, who, like the Bedford 88, were tested as they came consecutively from the courts. The figures for these 118, plus the Bedford 88, making a total of 206, are included in Table 90. Only about 25 per cent. either sitting or standing are as tall as, or taller than, the median normal individual of the same age. Over 76 per cent. are as heavy and, for the most part, are heavier than the median normal weight. Less than 25 per cent. have a grip with the right hand which is as strong as that of the median normal individual; with the left hand, only 19 per cent. equal or excel the median normal grip.

TABLE 90.

THE DISTRIBUTION OF THE HEIGHT, STANDING AND SITTING, OF THE WEIGHT, OF THE STRENGTH OF GRIP OF THE RIGHT AND LEFT HANDS OF 206 REFORMATORY WOMEN WITH RESPECT TO THE VARIOUS PERCENTILE GROUPS UNDER WHICH THEY COME IN SMEDLEY'S TABLES OF NORMAL INDIVIDUALS OF CORRESPONDING AGE.

| Smedley's Percentile Distribution | Height Standing | | Height Sitting | | Weight | | Grip Right | | Grip Left | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| Above 100 | 1 | .5 | 0 | 0 | 2 | 4.9 | 1 | .5 | 1 | .5 |
| 90–100 | 9 | 4.4 | 5 | 2.4 | 53 | 25.7 | 4 | 1.9 | 3 | 1.5 |
| 80–90 | 16 | 7.8 | 11 | 5.3 | 41 | 19.9 | 8 | 3.9 | 5 | 2.4 |
| 70–80 | 7 | 3.4 | 9 | 4.4 | 21 | 10.2 | 11 | 5.3 | 7 | 3.4 |
| 60–70 | 7 | 3.4 | 10 | 4.9 | 17 | 8.4 | 10 | 4.9 | 8 | 3.9 |
| 50–60 | 10 | 4.9 | 16 | 7.8 | 14 | 6.8 | 14 | 6.8 | 15 | 7.3 |
| 40–50 | 18 | 8.8 | 16 | 7.8 | 19 | 5.3 | 9 | 4.4 | 14 | 6.8 |
| 30–40 | 17 | 8.4 | 21 | 10.2 | 6 | 2.9 | 21 | 10.2 | 13 | 6.3 |
| 20–30 | 22 | 10.6 | 26 | 12.6 | 12 | 5.8 | 18 | 8.8 | 25 | 12.1 |
| 10–20 | 34 | 16.5 | 28 | 13.6 | 10 | 4.9 | 32 | 15.6 | 35 | 17.0 |
| 0–10 | 57 | 27.7 | 54 | 26.2 | 11 | 5.3 | 66 | 32.0 | 67 | 32.5 |
| 0 | 2 | 1.0 | 0 | 0 | 0 | 0 | 3 | 1.5 | 1 | .5 |
| Below 0 | 6 | 2.9 | 10 | 4.9 | 0 | 0 | 9 | 4.4 | 12 | 5.8 |
| 25th Percentile | 40–50 | | 40–50 | | 90–100 | | 40–50 | | 40–50 | |
| Median | 20–30 | | 20–30 | | 70–80 | | 20–30 | | 10–20 | |
| 75th Percentile | 0–10 | | 0–10 | | 40–50 | | 0–10 | | 0–10 | |

*Steadiness of Hand.* In steadiness of hand, both the Below-Grade Group and the Grade Group are markedly superior to the working girl of fifteen. Seventy-five per cent. of the Bedford 88 are as precise in their movements as the average working girl or more so. Whatever superiority is theirs as a result of greater maturity is unimpeded by any anticipation or dread of mishap. This same unimaginative insensitivity to possible accident characterizes their work in factories when they operate unguarded and dangerous machines. They may be in continuous danger because of clumsiness and inattention, but only infrequently because of loss of control resulting from fear or any appreciation that the danger of accident is increasing because

of increasing fatigue. In this they differ radically from university students when facing the same type of situation. This statement is based upon data obtained from a duplication of the factory experiments of Bogardus[1] with a small group of Bedford women.

*Tapping Test.* The measure of the fatiguability of our subjects by the tapping test was not altogether successful, because so many of the women failed to grasp the direction: "Tap as fast as you can." So far as one may judge by the results, however, the presumption is in favor of a division into two rather clearly differentiated groups, one less fatiguable than the fifteen-year-old girl or than the university student, the other more fatiguable than either the normal girl or the more intelligent adult.

The test affords an excellent example of the incapacity of many criminal women to understand even very simple directions and emphasizes the need there is that greater care be given directions than is commonly the custom. The Grade Group are much quicker to understand the directions than is the Below-Grade Group and the 8th Grade than the 5th Grade. The test may prove valuable to separate out those who can learn to perform simple factory operations rapidly from those who learn slowly. When all have understood the directions clearly and are tapping at their maximum speed in an initial trial, one will not go far amiss if he assumes that about 75 per cent. of the Reformatory women will tap as quickly as the median working girl of fifteen. It may also be affirmed that they will tap relatively better with the left hand as compared with the right hand than will the normal individual. As the case now stands, only the 25th percentile group of the Bedford 88 tap as rapidly with the right hand in 60 sec. as the corresponding group of the working girls of fifteen; the median record is 15, the 75th, 53 taps behind the standard at these points. More than 50 per cent. of the Grade Group tap as quickly, or more rapidly,

[1] Bogardus, Emory S. The Relation of Fatigue to Industrial Accidents. *American Journal of Sociology*, Vol. XVII. 1911–1912. Weidensall, Jean. Psychological Tests as applied to the Criminal Woman. *Psychological Review* Vol. XXI, No. 5, Sept. 1914.

than the median working girl of fifteen, though they, too, are in arrears at the 75th percentile record, though only by 10 taps. The Grade Group is superior at all points to the Below-Grade Group. Perhaps the most frequent difference of our subjects from that of the standard lies in the fact that the maximum rate of tapping is not attained until the latter part of the tapping period instead of at the beginning. The *total number of taps* for the two groups may not differ appreciably, for, while the one—the standard—taps as fast as it can during the first half-minute and slows down from fatigue in the last half, the other taps approximately as fast as it can the last half minute and at a slower rate during the first half-minute because of slowness to comprehend what was required.

*Cancellation of Letters and Card Sorting.* The next two tests —card sorting and cancellation of *a*'s—are of especial interest because they entail so nearly the same type of co-ordination as is involved in factory jobs. To mark out all the *a*'s on a page of letters is not unlike inspecting garments, or the labels on dishes or handkerchiefs in a factory where the operator's task is to set aside or check off all the defective ones. Sorting cards is quite like sorting samples or packing playing cards.

In card sorting, the Bedford 88 prove as accurate as the working girl. Fifty of the 88 made no error, 23 made but one error, 9 made only two errors and the dullest individual of all sorted 81.3 per cent. of the cards accurately. When efficiency, however, is measured in terms of speed of performance—the time required to secure a corresponding degree of accuracy—they are upon the whole less efficient than the working girl of fifteen. Only 12 of the 88, 13.6 per cent., work as rapidly as the 25th percentile individual among the working girls, only 35 women, or 39.8 per cent., equal, or excel, in speed the median standard record, while 34, or 38.7 per cent., are as slow as, or slower than, the poorest quarter of the fifteen-year-old girls and 16 per cent. are as poor as, or poorer than, the poorest 2 per cent. of the standard. The Grade Group, on the other hand, again compare more favorably. They are as skillful and work as rapidly in proportion to their accuracy as does the fifteen-year-old girl. Whereas 32 per cent. of the Below-Grade Group are as

poor as, or poorer than, the lowest 2 per cent. of the working girls—only 2 per cent. of the Grade Group have scores this low. It must be noted, however, that, whereas the working girl of fifteen markedly surpasses her fourteen-year-old record, our subjects, even those with equivalent schooling, although they are twenty and a half years old on the average, are scarcely better at the three percentile points than the working girl of fifteen.

Of the Maids, 72 per cent. attain or surpass the median index record of the working girl of fifteen, 50 per cent. her 25th percentile record; only 5.5 per cent. are as slow as the record that marks the 75th percentile of the standard group.

It does not seem that ability to sort cards either quickly or well ought to depend in any vital way upon the amount of schooling an individual fortuitously secures. If skill in this test correlates in any measure with school grade, as it does, this skill must presumably be due to something inherent in the individual's native ability, which has in turn enabled her to keep up to grade.

The working girls of fourteen or of fifteen are better on the average at card sorting if they have passed the 8th grade than if they have passed only the 5th grade. The same differences persist among our subjects who have been out of school 5 years on the average. In other words, there is at least a rough correspondence between efficiency as measured by this test and general intelligence as graded by the schools.

The results of different investigators in the relation of motor tests to general intelligence and native ability have not always coincided. Terman and Bagley find a negative correlation; Simpson, a slight positive one between intelligence and skill. We find for the Bedford 88 a positive correlation of +.58 between rank in the index of card sorting and +.52 between the *a* test index and rank in general intelligence as estimated by the principal of the Reformatory school.

In the cancellation of letters, the Reformatory group is again more accurate for the most part than the standard group—in this instance the working girl of fourteen. Forty-nine per cent. cancel at least as many of the *a*'s as does the working girl whose

record marks the 25th percentile score; only 18 per cent. of them, however, cancel an equivalent number of letters in the same amount of time. Seventy-one per cent. equal or excel the median working girl in accuracy, but only 36 per cent. have an index score equal to the median standard index. Whereas only 18 per cent. are as inaccurate as the least accurate quarter of the standard, 32 per cent. are as slow as, or slower than, the slowest standard quarter. Ten per cent. are as slow as, and slower than, the least expeditious 2 per cent. of the stand ard.

The scores of the Grade Group are superior to, and beyond the range of, all save the best 25 per cent. of the Below-Grade Group. The former are slightly superior but parallel pretty closely the range and distribution of the fourteen-year-old girl's index scores; none of them are as slow as the slowest 2 per cent. of the standard, whereas 27 per cent. of the Below-Grade Group fall at or below such a rate of performance.

The College Maids are superior both in time and in accuracy, to the standard group. While but 44 per cent. are as quick as the best 50 per cent. of the standard group, 38 per cent. equal or excel the standard 25th percentile rate in speed and only 11 per cent. are as belated as the slowest standard quarter. Seventy-eight per cent. of them are as efficient, when measured by index score, as the *median Reformatory* subject.

Our 7th and 8th Grade Groups cancel the number "1" as quickly and as accurately, on the average, as did the University women who were tested by Woodworth and Wells. The 5th and 6th Grades are slower in their average scores, by 17.3 sec. and 32.5 sec., respectively, the Below-Grade Group by 69 sec. and is much less accurate. All but 3 scores among the Below-Grade Group are more than 15 sec. (the M.V. of the University women) slower than the average score of the University women or of the 7th and 8th Grade Groups of the Reformatory women, and only one score is as good as the average of the University group. These time scores are not an index but are the actual average time consumed.

In the cancellation of both numbers and letters, there is a tendency for individual differences to be more pronounced in

the matter of rate than in accuracy of performance. There is, however, a distinct range of inaccuracy, which is characteristic of the dullest quarter of the Reformatory women.

*Memory for Numbers.* Of the Bedford 88 just 36 per cent. have a memory span of eight numbers, *i. e.*, that of the median working girl of fifteen. Thirty-eight per cent. recall at least one number less than seven, the score which marks off the poorest quarter of the working children. The Cincinnati group was not given series shorter than seven numbers, so that the exact number of digits which can be recalled by those whose span is less than seven is not known. The per cent. of seven numbers which they recalled, however, may be taken as some indication of its length. Only 25 per cent.—the poorest quarter—of the working girls of fifteen recall less than 88 per cent. of seven numbers, whereas 56 per cent. of the Reformatory women recall no more than that per cent. of the seven numbers series and 23 per cent. recall less than the least amount recalled by *any* of the working girls of fifteen, *i. e.*, 57 per cent. of seven numbers. The working children seldom fail to recall all of the seven numbers in at least one out of two trials. Of the Reformatory women, 38 per cent. have a memory span of not more than six numbers and 30 per cent. fail to recall even that number. Of the Maids, 78 per cent. recall as long a series, *i. e.*, eight numbers, as the median working girl of fifteen; 60 per cent. recall nine numbers—the 25th percentile score of the working girl of fifteen. Longer series than nine numbers were not given to the standard group. Two series ten numbers long were given to the Maids and the Reformatory group. Of the latter, eight, *i. e.*, 9 per cent., recalled ten numbers; of the former four, or 22 per cent.

The length of number series recalled by the group of the Binet 200 is of interest here to indicate results obtained by a different method of presentation of number series. The results show that 53 per cent. of the Binet 200 fail to recall all of seven numbers while of the Bedford 88, tested with the visual-auditory-articulatory form of presentation, only 38 per cent. fail to recall the seven digit series. To the Binet group the numbers were read aloud by the experimenter at the rate of one each half second; the subject herself did not see the numbers. In the Binet

series the subject repeated the numbers verbally, in the Cincinnati series she wrote them down. The Binet test gave three trials for each series of a given length; the method of the Vocational Guidance Bureau gave but two trials for each. The advantage on the latter score lies with the group tested by the Binet method but with the Cincinnati series in the rate at which the numbers are presented to the subject.

Table 91 indicates the per cent. of numbers recalled by those of the Binet 200 at the different mental ages as established by the Binet tests. But 25 per cent. of those who test nine years old, 17 per cent. of those who test eight years and zero per cent. of those below eight, overlap, in memory span, the better 60 per cent. of those who test ten years old or the better 72 per cent. of those who test eleven.

The distribution of their scores most nearly resembles that of the *retarded* girl of fourteen, for 52 per cent. succeed in recalling as much as, or more than, the median among this group of 5th and 6th grade working girls, and 42 per cent. recall at least as many numbers as does the best quarter of this retarded group of working girls. On the other hand, 28 per cent. recall as little as, and less than, the amount recalled by the poorest 4 per cent. of the standard.

In memory for eight and nine numbers, the per cent. which recall as much as the median of the standard group of fifteen years, and the retarded girls are

| | | | |
|---|---|---|---|
| 8 Numbers..... | 28.5 | 31.8 | 38.6 |
| 9 Numbers..... | 37.5 | 42.0 | 52.3 |

In memory for eight numbers, they are thus inferior even to the retarded group; in memory for nine numbers, equal to them. In memory for nine numbers, 49 per cent. of the Bedford 88 are as poor, or poorer than, the poorest 25 per cent. of the working children of fifteen, and 25 per cent. recall as little as, or less than, is recalled by the poorest 4 per cent. of the standard.

Dr. Woolley found a more pronounced correlation between general intelligence, as estimated by the schools, and (1) memory-span scores and (2) the per cent. of seven, eight and nine numbers recalled than with any other test. Simpson found a higher

positive correlation between estimated intelligence and memory for words than in any test except hard opposites.

We, too, find that memory for numbers, presented as these are in visual, auditory and articulatory form, separates with a very clear line of cleavage the Grade from the Below-Grade Group. In memory span, and in per cent. of seven, eight and nine numbers recalled, over 75 per cent. of the Below-Grade Group overlap and lag behind the poorest quarter of the Grade Group. And, while as few as 20, 10, 7 and 5 per cent. of the Grade Group in these four tests, respectively, recall as little as the poorest 13, 4, 2 and 4 per cent. of the standard group, there are 70, 56, 35 and 59 per cent. of the Below-Grade Group who recall this little. The Grade Group in span and recall of nine numbers is the equal of the working girl of fifteen. In per cent. of seven and eight numbers recalled, their scores are inferior. The recall of eight numbers is relatively more difficult for our subjects than for the standard groups, and the facts seem, as indicated above, to point to possible limitations in the use of visual symbols, to a difference in type of imagery customarily used.

TABLE 91

MEMORY SPAN—BINET SERIES.

| Length of Number Series Recalled | 6 Yrs. | | 7 Yrs. | | 8 Yrs. | | 9 Yrs. | | 10 Yrs. | | 11 Yrs. | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| 7 Nos. | | | | | 1 | 8.3 | 11 | 23.4 | 36 | 51.4 | 29 | 53.7 | 77 | 38.5 |
| *Total 7 or more Nos.* | | | | | 2 | *16.7* | 12 | *25.5* | 42 | *60.0* | 39 | *72.2* | 95 | *47.5* |
| 6 Nos. | | | | | 2 | 16.7 | 18 | 38.3 | 24 | 34.3 | 13 | 24.1 | 57 | 28.5 |
| 5 Nos. | | | 7 | 46.7 | 4 | 33.3 | 10 | 21.3 | 3 | 4.3 | 0 | 0.0 | 24 | 12.0 |
| 5—Nos. | 2 | 100 | 8 | 53.3 | 4 | 33.3 | 7 | 14.9 | 1 | 1.4 | 2 | 3.7 | 24 | 12.0 |
| *Total less than 7 Nos.* | 2 | *100* | 15 | *100.0* | 10 | *83.3* | 35 | *74.5* | 28 | *40.0* | 15 | *27.8* | 105 | *52.5* |
| Totals | 2 | | 15 | | 12 | | 47 | | 70 | | 54 | | 200 | |

These tests also serve the purpose of isolating fairly fine gradations of individual differences. The correlation between the rank of merit in these tests and the individual ranking in native capacity accorded by the principal of the institution school is:

| | | |
|---|---|---|
| Memory span | r = +.66 | P.E. = .042 |
| Recall of seven numbers | r = +.65 | P.E. = .046 |
| Recall of eight numbers | r = +.62 | P.E. = .048 |
| Recall of nine numbers | r = +.60 | P.E. = .05 |

*Substitution Test.* A learning test which will differentiate between those who are naturally dull and not able to learn and those who have good native ability but who have had little opportunity for education and development is important for clinical and institutional purposes. It is likely that some association that would approximate more closely the actual learning conditions of factory and store, like the association of stock number with pictured stockings of various colors, or of stock number with postal cards of different seasons, viz., Christmas card No. 804, Easter card No. 429, etc., would give a truer measure of the normal adult's ability to form simple every day associations than does the Cincinnati form of substitution test. In any event we are finding that the less obviously associated numbers and figures of the latter are proving more difficult for the efficient working woman of twenty to learn than for the working girl of fifteen. This statement is based pretty largely upon the results we are now securing for a group of first class saleswomen in one of New York's larger department stores, who are doing excellently in other tests of the Bureau of Vocational Guidance. Of the College Maids the records for page four show that but 27 per cent. equal, or surpass, the standard median in accuracy and only 33 per cent. in index scores.

Two things are obvious from the results of this test: (1) The Reformatory women are nearly as able to make the substitutions from the key as are the working girls of fifteen, but they are slower to adapt to the conditions of the test. This is evidenced by the fact that a smaller per cent., not only of the Below-Grade Group, but of the Grade Group reach the median of the Cincinnati girl of fifteen on the first and last pages than do so on the second and third. (2) The various Reformatory groups differ more from the standard and from each other in the rate of performance than they do in accuracy of their work.

On page one, 35 per cent. of the Bedford 88, on page two, 42 per cent., and on page three 40 per cent. have an index score as good as, or better than that of the median working girl of fifteen. On page four, 34 per cent. of them recall as much as does the median girl of fifteen. In *index* score, page one, 19 per cent. of the Bedford 88, on page four, 16 per cent. reach, or surpass, the 25th percentile of the Standard group, while 52 per cent. on page one and the same per cent. on page four recall as little as, or less than, did the poorest quarter of the working girls. Indeed, on pages one and four, 32 per cent. recall as little as the poorest three and five per cent. of the Standard group, respectively.

Pages one and four divide the Reformatory Women into two groups which confirm the public school's estimation of their intelligence; they separate clearly the Grade Group from the Below-Grade Group. On page one the median score of the working girl of fifteen is accomplished by 65 per cent. of the Grade Group in accuracy and by 57 per cent. in index, whereas but 29 per cent. of the Below-Grade Group reach this standard record in accuracy and zero per cent. in index. On page two 78 per cent. of the Grade Group in accuracy and 63 per cent. in index attain the median standard score as over against only 44 per cent. of the Below-Grade group in accuracy and but 9 per cent. in index. On page three, of the Grade Group 80 per cent. in accuracy, 52 per cent. in index reach the standard median score; of the Below-Grade Group only 59 per cent. reach this score in accuracy and but 21 per cent. in index. On page four, of the Grade group, 43 per cent. attain the median score of the working girl of fifteen in accuracy and 44 per cent. in index; of the Below-Grade Group only 21 per cent. in accuracy and 18 per cent. in index. On page one only 13 per cent. of the Grade Group, whereas 65 per cent. of the Below-Grade Group are as slow or slower in their index scores than the poorest 3 per cent. of the standard: on page four 55 per cent. of the latter as over against 22 per cent. of the former have scores as low as those of the poorest 5 per cent. of the standard.

The correlation between estimated innate capacity and rank in this test (index score of page four) proves to be somewhat less than that in the other tests—r = +.48; P.E. = .058.

The index of the first page is prophetic of the number of pages necessary finally to learn the association. The data upon which this statement rests will be published elsewhere in a paper on the rate at which the Reformatory women learn to perform such simple tasks as these substitutions at a normal rate of speed and with a normal degree of accuracy.

*Completion of Sentences.* Sixty per cent. of the Bedford 88 write at least as many *sentences correctly* as the median working girl of fifteen, 48 per cent. write as many as the best quarter of the standard. Over 75 per cent. of the Grade Group are better than the median standard record. The Below-Grade Group and the Grade Group scores overlap scarcely at all; more than 75 per cent. of the former group write more incorrect sentences than does the individual that marks off the poorest quarter of the latter. Thirty-three per cent. of the Below-Grade Group are poorer in their score of the number of sentences correctly written than any of either the Grade Group or the standard group.

*In the number of ideas* expressed in response to the initial words of this test, the Reformatory group as a whole have outdistanced the working girl of fifteen. Fifty-eight per cent. of them reach or surpass the median standard record. Forty-one per cent. reach or surpass the 25th percentile standard record. The two groups, Grade and Below-Grade, are definitely segregated, but curiously enough, the various grades are less clearly separated among themselves than in other of the tests, which are, supposedly, much less dependent upon school drill. Seventy-five per cent. of the Below-Grade Group express as few ideas as are expressed by the individual who marks off the poorest quarter of the Grade Group.

*In index of ideas,* the Bedford 88 are clearly differentiated into a good and a poor group. In the rate at which their ideas are expressed, 56 per cent. attain or surpass the median rate of response of the working girl of fifteen, *i. e.*, 10.2 sec. per idea: 42 per cent. attain at least the score of the standard 25th percentile, *i. e.*, 8.1 sec., and 36 per cent. are as poor as, or poorer than, the 55th percentile standard record. Twelve per cent. are as slow as, or slower than, the slowest 1 per cent. of the standard.

The Grade Group is superior to the working girl of fifteen at all three percentiles and at its best and poorest records, while almost 70 per cent. of the Below-Grade Group take at least one and one half times as long to think of each idea as the poorer quarter of the Grade Group or as did the median working girl of fifteen. Fifty-two per cent. take twice, or more than twice, as long. Of the Below-Grade Group 26 per cent., versus 3 per cent. of the Grade Group, are to be found at the point on the scale which marks off the slowest 1 per cent. of the standard. There is a genuine grade correlation both among the working girls and the Reformatory subjects; the curves of the various Reformatory grade groups and the corresponding ones of the working children coincide closely.

The Reformatory women as a whole lag behind the working girl of fifteen *in the speed with which they formulate their ideas*, that is, as measured by the time that elapses before they begin to write each sentence after its initial words are exposed. This in many cases may be accounted for by the fact that they formulated a larger number of ideas. Only 38 per cent. of them reach the median record of the standard group in the number of sentences which they begin to write without pausing for more than two seconds. Of the Below-Grade Group, not 25 per cent. begin as many as five sentences in this time, the number which were begun by the median working girl of fifteen. Of the Grade Group, however, approximately 45 per cent. begin the standard five sentences in the given time and are superior in the number of ideas formulated and the index of these ideas. Perhaps those more capable of formulating a greater number of ideas ought to do it with the same rapidity as the duller mind formulates its fewer ideas. If so, then the Bedford 88, as a whole, are slower than the working girl in this respect.

This test was the most difficult one to explain to our subjects and to conduct, yet it has brought out a response apparently more in favor of our subjects than did the other tests. For this reason and because our method varied slightly from that of the standard, further work should be done with it. Some essay to explain the superiority of the Reformatory women in the number of ideas expressed and in the number of sentences

correctly written was ventured above. It is, in part, certainly, the result of quarantine and the transient need it created for greater self-expression. Under similar conditions, the working girl would probably write more expansively also. On the other hand, the ideas expressed by the criminal woman are often diffuse and unorganized, quite lacking in the conciseness of mature persons.

*Easy Opposites Test.* Of the Bedford 88 but 39 per cent. attain or surpass the median record of the working girl of fifteen; only 20 per cent. equal or surpass the 25th percentile standard record, and 47 per cent. fall as low as, or below, the score of 71.2 per cent. of the 20 words correct—which score marks off the poorest quarter of the standard group. Of the Grade Group, 54 per cent. attained this median record; of the Below-Grade Group, only 15 per cent. Of the Grade Group, 31.5 per cent. attained at least the 25th percentile standard record and 33 per cent. are at least as lacking in capacity to form these simple logical associations as the poorest quarter of the standard, while 9 per cent. equal or surpass the poorest 1 per cent. of the standard. Of the Below-Grade Group, 97 per cent. are unable to form these associations as well as the 25th percentile standard girl; 73.5 per cent. are no more able to do so than the girl whose record marks off the poorest quarter of the standard; and 38 per cent. are as poor as, or poorer than, the dullest 1 per cent. of the working girls of fifteen. Of the Maids, 72 per cent. prove as capable as the median working girl, and 33 per cent. equal the 25th percentile record of the standard.

The correlation between rank in time and accuracy in this test for the Bedford 88 is $r = +.83$; P.E. = .029, but the time required to attain each decreasing degree of accuracy increases in proportion to the time required by the normal subject to attain the same degree of accuracy. For this reason, index scores in which the time and accuracy both figure, indicate more decided individual differences than accuracy alone.

The easy opposites test is the one which has proved most reliable for clinical use at our hands. It has given the largest positive correlation among our tests with the rank in native capacity as estimated by the school principal and with the series of rate of learning tests above referred to, which have

been conducted in addition to the tests of the Bureau of Vocational Guidance. Between the rank that our subjects secured for themselves in this opposites test during the first few days after entering the institution and the rank they were accorded by the school principal in capacity to profit by reformatory training, after they had been watched for eighteen months in the institution, $r = +.79$; P.E. = .026. This correlation warrants the inclusion of this test in the group selected for use in a clearance house.

The words of this test are of markedly unequal difficulty. For the group as a whole, the words *similar*, *peace*, *prompt*, *rapid* and *false* have the value of hard opposites. For the Below-Grade Group, the words *enemy*, *sorry*, *black*, *soft*, *rough*, *narrow*, *evening*, *stout*, and *few*, in addition, are so difficult that from 41 to 81 per cent. fail to get the exact opposite of them, while still others find only an approximately correct response. Even for the 7th and 8th grades, the words *similar* and *peace* are so difficult that 61 and 51 per cent., respectively, fail to write the correct responses. Thirty-four per cent. fail in response to *prompt*, 24 per cent. in response to *few*, 17 per cent. in response to *rapid*, 14 per cent. in response to *rough*, *soft*, and *false;* to all the others only 10 per cent., or less, fail to write the correct opposite. There is opportunity here for the formation of a list of increasingly difficult opposites which would be of genuine clinical value.

## Conclusions

In Table 92 are to be found the number and per cent. of the Bedford 88 whose records (1) come within the range of the best quarter of the working girl of fifteen, (2) equal or excel the median of the working girl of fifteen, (3) the median of the working girl of fourteen, (4) the median of the retarded working girl of fourteen, (5) the 75th percentile score of the retarded working girl of fourteen, and finally, (6) the per cent. of the Grade Group, the Below-Grade Group and the Bedford 88 that are to be found at, or below, that record point in the curves for the working children which marks off their poorest 1 to 5 per cent. These figures are not given for all the tests, but for

a selected group of ten. The basis of those selected is later explained.

In comparing the per cent. of Reformatory women who have equalled or surpassed the median record of the working girl of fifteen, it is obvious that the number varies from test to test and that it is not always 50 per cent. as in the standard group. Neither is the per cent. of our subjects who come within the range of the better 50 per cent. of the working girl of fifteen, some constant lesser per cent. than 50, but ranges in the mental tests from 28.4 per cent. in the "per cent. of eight numbers recalled" to 60.3 per cent. in the "number of sentences correctly completed." It is obvious that some of the tests are more difficult than others for our subjects in comparison with their difficulty for the working girls. The mode of the per cent. of the Bedford 88 who are at least as good as the standard median in the mental tests (including tapping test) is from 30 to 39 per cent.

There are from 8 to 37 per cent. of the Bedford 88, depending upon the test in question, whose records are at least as poor as those of the poorest 1 to 5 per cent. of the fifteen-year-old working girls. In the ten selected mental tests, the average per cent. of the Bedford 88 for whom this is true is 23, the median 25 and the mode 32 per cent. It may easily be affirmed then that at least 25 per cent. of the Bedford 88 have decidedly less ability, in whatever these ten tests measure, than the fifteen-year-old working girl.

From 27.3 per cent. of the Bedford 88 in card sorting to 50 per cent. in page four, substitution index, scored as low as, or lower than, the dullest quarter of the retarded group of working girls when retested at fifteen after a year of working experience. Of the Bedford 88 the median for the ten tests who test this low is 38.2, the average is 39.5, the mode 37.6. *We may therefore set it down with some finality that approximately 40 per cent. of the Bedford 88 are decidedly less efficient in whatever these tests measure than is the average Cincinnati working-girl of fifteen.* The other 60 per cent. represents the Grade Group for the most part, and all the curves and tables of this volume show that they parallel in the range and the distribution of their records those of the total group of the fifteen-year-old working girls. *This means that it may also be affirmed*

*that about 33.3 per cent. of the Bedford 88 are at least as intelligent and as efficient in whatever these tests measure as is the average Cincinnati working-girl of fifteen.* Whether this third, or some proportion of them, are, in addition, normal adults in their efficiency cannot be decided at present. It will first be necessary to determine norms for a larger group than that of the College Maids of efficient, law-abiding, working women, such as successful saleswomen, housemaids, laundresses, factory operators, etc., who are as old on the average as are the Bedford women. Such groups are being tested by the writer and at the present time the work is well under way.

When the Cincinnati Bureau has completed its work and the norms are available for the maximal development of its subjects, when we have at hand data to tell us in what tests, to what extent and for how many succeeding years the fourteen-year-old girl continues to show increasing skill in the tests, we shall also be well on our way to a safe estimate of how many of the Reformatory women are normal for their age. In every phase of every test Dr. Woolley reports that the working girl at fifteen surpasses her record of fourteen years of age. If at sixteen, seventeen and eighteen she still continues to do better than at each preceding year, then there are very few of the type of criminal woman that is sentenced to a reformatory such as Bedford, who are normal adults in the mental characteristics and abilities measured by these tests.

The records of our group of College Maids serve to give some indication regarding the norms of the efficient working woman and of what one may expect to find with respect to the development of the working children upon their re-testing at sixteen, seventeen and eighteen. Roughly speaking, in card sorting, in memory span and easy opposites, 70 per cent. of the Maids correspond to the better 50 per cent. of the working girls of fifteen. In index, page four, and cancellation of *a*'s, a smaller per cent. parallel the better half of the standard. The number of Maids is small, yet it may be surmised that since they do not greatly surpass the records of the fifteen-year-old children of equivalent schooling—the working children who enter occupation, and who prove to be efficient and law abiding—will themselves not greatly surpass during succeeding years their fifteen-year-old median record in these tests. *If the Maids' scores are*

*typical of the ability of the majority of efficient working women, then approximately one-third, i. e., half of the Grade Group and some few of the Below-Grade Group, test up to the standard median record of the normal working women in a majority of such a group of tests as these herein described.*

I suspect that from 15 to 20 per cent. of women such as are sent to Bedford equal the average of the better type of saleswoman in ability, that another 25 per cent. equal the average housemaid or laundress and that the others are inferior to the average, even of yet less skilled workers.

TABLE 92.

NUMBER AND PER CENT. OF BEDFORD 88 WHOSE SCORES ARE

| | At or Above | | | | | | At or Below | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | C.15 25th Percentile Record | | C.15 Median Record | | C.14 Median Record | | C.14 Ret. Median Record | | C.14 Ret. 75th Per Record | |
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| 1. Accuracy *Opposites Test.* | 18 | 20.5 | 34 | 38.7 | 34 | 38.7 | 37 | 42.1 | 41 | 46.7 |
| 2. Index of Ideas—*Completion of Sentences Test.* | 37 | 42.1 | 49 | 55.8 | 51 | 58.0 | * | | 33 | 37.6† |
| 3. Index Page I. | 17 | 19.3 | 31 | 35.3 | 37 | 42.1 | 44 | 50.0 | 37 | 42.1 |
| 4. Index Page IV. *Substitution Test.* | 14 | 15.9 | 30 | 34.1 | 34 | 38.7 | 38 | 43.2 | 44 | 50.0 |
| 5. Memory Span. | 18 | 20.5 | 32 | 36.4 | 32 | 36.4 | 55 | 62.6 | 33 | 37.6 |
| Recall of 7 Nos. | 29 | 33.0 | 29 | 33.0 | 37 | 42.1 | 46 | 52.3 | 34 | 38.7 |
| 6. Recall of 8 Nos. *Memory* | 12 | 13.7 | 25 | 28.4 | 28 | 31.9 | 34 | 38.7 | 33 | 37.6 |
| Recall of 9 Nos. *Test* | 13 | 14.8 | 33 | 37.6 | 37 | 42.1 | 46 | 52.3 | 42 | 47.8 |
| 7. Index *Cancellation Test.* | 16 | 18.2 | ‡ | | 33 | 37.5 | 39 | 44.4 | 30 | 34.1 |
| 8. Index *Card Sorting Test.* | 12 | 13.7 | 35 | 39.8 | 54 | 61.5 | 54 | 61.5 | 24 | 27.3 |
| 9. No. *Taps* in 60″ Right Hand. | 25 | 28.5 | 36 | 41.0 | 44 | 50.0 | 44 | 50.0 | 39 | 44.4 |
| 10. No *Taps* in 60″ Left Hand. | 31 | 35.3 | 49 | 55.8 | 57 | 64.9 | 59 | 67.1 | 26 | 29.6 |

* No data.

† C. 14 75th Percentile substituted, for there was no C. Retarded 14 75th percentile computed for this test.

‡ Cancelled "m's."

TABLE 92—*Continued*

PER CENT. OF GRADE GROUP, BELOW-GRADE GROUP, AND BEDFORD 88 WHOSE SCORES ARE

| At or Below | Bedford Grade Group | Bedford Below-Grade Group | Total 88 |
|---|---|---|---|
| | Per Cent. | Per Cent. | Per Cent. |
| 1. Poorest *one* per cent. of C.15. | 9.0 | 38.0 | 20.0 |
| 2. Poorest *one* per cent. of C.15. | 3.0 | 26.0 | 12.0 |
| 3. Poorest *three* per cent. of C.15. | 13.0 | 65.0 | 32.0 |
| 4. Poorest five per cent. of C.15. | 22.0 | 55.0 | 32.0 |
| 5. Poorest *one* per cent. of C.15. | 12.0 | 63.0 | 29.0 |
| Poorest *four* per cent. of C.15. | 10.0 | 56.0 | 28.0 |
| 6. Poorest *two* per cent. of C.15. | 7.0 | 35.0 | 17.0 |
| Poorest *four* per cent. of C.15. | 5.0 | 59.0 | 25.0 |
| 7. Poorest *one* per cent. of C.14. | 0.0 | 20.0 | 8.0 |
| 8. Poorest *two* per cent. of C.15. | 2.0 | 32.0 | 16.0 |
| 9. Poorest *four* per cent. of C. 15. | 23.0 | 58.0 | 37.0 |
| 10* | | | |

From a clinical point of view, when one has obtained the responses of a subject in these tests and checked each test with respect to whether it is above, below, or equal to, the standard norm, it becomes of immediate concern, if one is to summarize the record, to know in addition in how many or in which specific ones of these tests her ability should be above the median standard record to approximate the normal. It may be that an individual whose rank is high, intermediate, or low, in one of these eleven tests of the Vocational Guidance Bureau, or in certain phases of them, will not have an identical or even approximately corresponding rank in the other tests. Too, it may be that to be above the median of the fifteen-year-old girl in some of these tests is a sign of immaturity rather than otherwise. For the present we have not calculated correlations between the various pairs of these tests. We have instead calculated the number of working girls and of Reformatory women who are above the standard median score in from all (one

hundred per cent.) to none (zero per cent.) of a selected group of ten of these tests.

The tests selected for this comparison were those which seemed to include all of the more important processes tested and to exclude, as far as possible, any clear and extreme instances of reduplication. The records selected are: (1) accuracy in opposites, (2) index of ideas in the sentence completion test, (3) memory span, (4) above the median in two out of three of the three memory tests (recall of seven, eight and nine numbers), (5) substitution index, page one, (6) substitution index, page four, (7) index in cancellation of *a*'s, (8) index in card sorting, (9) total taps of right hand in sixty seconds, (10) total taps of left hand in sixty seconds. In the fourth item the memory tests were combined, so that there should not be a disproportionate number of them. Substitution pages two and three were omitted, so as not to duplicate the same type of process. The index of tapping was not a success as such and was omitted because the results were ambiguous. The steadiness test was omitted, inasmuch as it seemed to be more largely a physical test in which our subjects had a disproportionate degree of success. The number of plus signs in this latter test would bring up unduly the average number of mental tests in which the Reformatory subjects were above the standard median as compared with the number of tests in which the working girls were themselves above their own median. Our aim at this point was to compare the rank of the two groups in the more purely "mental" tests.

The records which we used as a basis for the calculation of the standard norms as to the number of tests in which the working girls are above their own median record were those of the public-school girls as re-tested at fifteen. Of these there were 109 after all individuals had been discarded for whom a record in any one of the ten tests in question was missing. The median used was that recorded in the percentile tables in the preceding pages. This median was compiled by the Bureau of Vocational Guidance on the basis of both Catholic and public schools. When we discarded some of the public school records and omitted all of the Catholic school girls, we shifted the balance somewhat, so that exactly 50 per cent. do not come above the

score that was the median score of the original number. The Catholic girls were omitted partly to save time, but chiefly because so few of our subjects had been educated in Catholic schools.

The 109 Cincinnati records were separated into two groups, those of the 7th and 8th grades taken together and the 5th and 6th grades together. These were then each again divided into groups according to the number of tests in which an individual's records was above the median standard score for each test. Then the records were analyzed to see if there was a tendency for those above the median in one test to be above in all the others and for those who were below the median in one to be below in all, or if the tests presented individual or group differences in this respect. (See Table 94.)

Curve 95 gives the distribution of the three groups—the Bedford Grade Group, the Bedford Below-Grade Group, and the total C. 15 public school group—in the ten selected tests. The ordinate marks the per cent. of individuals to be found at any point on the abscissa; the abscissa marks off the number of tests in which the subjects have a score above the median of the working girls of fifteen, *i. e.*, in ten tests, nine tests, eight tests, etc. Table 93 indicates the number and percentages upon which this frequency curve is based.

There proves to be a fairly wide range of distribution in the standard group with respect to the number of tests in which any individual among them may be expected to be above the median record of the group. The median number and the mode is 6 tests, Q is 1½ tests. Certainly there is no marked tendency for those who are above the average in one test to be above in all of the ten, or for those who are poor in one to be poor in all the others. Indeed, only 3.4 per cent. are above the median in all ten tests, 6.2 above in nine. The median for the 7th and 8th grades taken alone is 7 tests, the 25th percentile is 8, the 75th is 6 tests. The 5th and 6th grades alone are quite inferior to these. The 25th percentile is 6, the median 4, the 75th percentile only 3 tests among the 10 above the median. As compared with the working girls of fifteen, the Bedford Grade Group is better at the 25th percentile by one test, and is the same at the median and 75th percentile points. The Below-Grade Group, on the other hand, is unmistakably inferior. (See Table 93.) Only 20.5 per cent. are above or equal

to the median in as many tests as is the number for the 75th percentile score of the working girls; only 2.9 per cent. are equal to the standard median in 6 tests, the number of tests in which the median working girl is above the median score for each individual test. Twenty-three and five-tenths per cent. are as poor as the poorest 5.7 per cent. of the working girls and 41.2 per cent. are poorer than the poorest standard record, *i. e.*, above the median in fewer tests than they.

Thus when the mentality of the criminal women is measured by the number of tests in which their ability is at or above that of the median working girl of fifteen, again about a third of them (35 per cent.) fall within the range of the better fifty per cent. of the working girls of fifteen, about two-thirds below the median, 54 per cent poorer than all but the poorest 25 per cent. of the standard, 30.7 per cent. as poor as the poorest 5.7 per cent. and 17 per cent. poorer than any of the working girls.

TABLE 93.

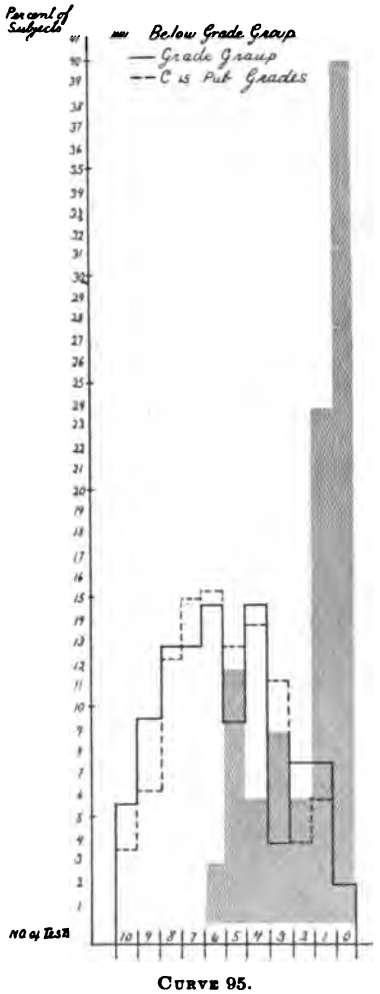
PER CENT. OF SUBJECTS ABOVE C. 15 MEDIAN IN GIVEN NUMBER OF THE TEN TESTS.

| No. of Tests | C.15 7 and 8 Pub. Grades | | C.15 5 and 6 Pub. Grades | | Total C.15 Pub. Grades | | Bedford Gr. Group | | Bedford Below-Gr. | | Bedford Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| 10 | 3 | 7.0 | 0 | | 3 | 3.5 | 3 | 5.6 | | | 3 | 3.4 |
| 9 | 4 | 9.3 | 2 | 3.0 | 6 | 6.2 | 5 | 9.2 | | | 5 | 5.7 |
| 8 | 10 | 23.3 | 1 | 1.5 | 11 | 12.2 | 7 | 13.0 | | | 7 | 8.0 |
| 7 | *9*† | 20.9 | 6 | 9.1 | 15 | 15.0 | 7 | 13.0 | | | 7 | 8.0 |
| 6 | 8 | 18.6 | 8 | 12.1 | *16* | 15.4 | *8* | 14.8 | 1 | 2.9 | 9 | 10.2 |
| 5 | 2 | 4.7 | 14 | 21.2 | 16 | 12.9 | 5 | 9.2 | 4 | 11.8 | 9 | 10.2 |
| 4 | 4 | 9.3 | *12* | 18.2 | 16 | 13.7 | 8 | 14.8 | 2 | 5.9 | *10* | 11.3 |
| 3 | 2 | 4.7 | 12 | 18.2 | 14 | 11.4 | 2 | 3.7 | 3 | 8.8 | 5 | 5.6 |
| 2 | 0 | | 5 | 7.6 | 5 | 3.8 | 4 | 7.4 | 2 | 5.9 | 6 | 6.8 |
| 1 | 1 | 2.3 | 6 | 9.1 | 7 | 5.7 | 4 | 7.4 | *8* | 23.5 | 12 | 13.7 |
| 0 | 0 | | 0 | | 0 | | 1 | 1.9 | 14 | 41.2 | 15 | 17.0 |
| | 43 | | 66 | | 109 | | 54 | | 34 | | 88 | |

| | | | |
|---|---|---|---|
| 25th Percentile | 7 Tests | 8 Tests | 3 Tests |
| Median | 6 " | 6 " | 1 " |
| 75th Percentile | 4 " | 4 " | 0 " |
| Q | 1½ " | 2 " | 1½ " |
| Mode | 6 " | 6 & 4 Tests | 0 " |

ined by taking the average of per cents. for the 8th and 7th and h grades.

talicized include the median record of the group.




CURVE 95.

**Per cent. of Below-grade, Grade and C. 15 public group who are above C. 15 median in Ten, Nine, Eight, etc., of the Ten Tests Tabulated**

Another question of importance from a clinical point of view is whether the six tests in which the median working girls' rank is as high as, or above, the median girl's are consistently the same six tests. Do those who are above in nine of the tests all fail on the same test or do the tests all fare alike and does a chance ten per cent. of the failure fall to each of the ten? To determine this the records of the working girls of the public schools and of the Reformatory group were each divided into the groups who were above the median score in nine, eight, seven, six, five, four, three, two and but one of the tests. Each of these groups was then checked with respect to the number and per cent. who failed to reach the median score in each of the ten tests. This data is tabulated in Table 77. The number of subjects in each group is so small, however, that a chance additional failure or success at any point makes a disproportionate amount of difference in the percentages. The data, nevertheless, do show that none of the ten tests is markedly easier or more difficult for those of the subjects who are above the median in any given number of tests; nor are there any very extreme differences between the working children and the Reformatory subjects.

TABLE 94.

| Bedford 88 | Subjects + in 9 Tests | | Subjects + in 8 Tests | | Subjects + in 7 Tests | | Subjects + in 6 Tests | | Subjects + in 5 Tests | | Subjects + in 4 Tests | | Subjects + in 3 Tests | | Subjects + in 2 Tests | | Subjects + in 1 Test | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tests | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| 1. Opposites Acc. | 2 | 40.0 | 1 | 14.3 | 2 | 28.6 | 4 | 44.4 | 2 | 22.2 | 6 | 60.0 | 4 | 80.0 | 6 | 100.0 | 12 | 100.0 |
| 2. Sentence Index Ideas | 1 | 20.0 | 0 | | 1 | 14.3 | 1 | 11.1 | 1 | 11.1 | 4 | 40.0 | 2 | 40.0 | 4 | 66.6 | 10 | 83.3 |
| 3. Memory Span | 0 | | 1 | 14.3 | 5 | 71.4 | 3 | 33.3 | 6 | 66.7 | 5 | 50.0 | 5 | 100.0 | 4 | 66.6 | 12 | 100.0 |
| 4. Memory 7–8–9 Nos. | 0 | | 2 | 28.6 | 5 | 71.4 | 4 | 44.4 | 6 | 66.7 | 6 | 60.0 | 4 | 80.0 | 5 | 83.3 | 12 | 100.0 |
| 5. Sub. Pg. 1 Index | 0 | | 0 | | 0 | | 4 | 44.4 | 8 | 88.9 | 8 | 80.0 | 4 | 80.0 | 6 | 100.0 | 12 | 100.0 |
| 6. Sub. Pg. 4 Index | 0 | | 3 | 42.8 | 3 | 42.8 | 3 | 33.3 | 5 | 55.6 | 9 | 90.0 | 3 | 60.0 | 6 | 100.0 | 11 | 91.6 |
| 7. Index Cancellation "a" | 1 | 20.0 | 2 | 28.6 | 2 | 28.6 | 5 | 55.5 | 6 | 66.7 | 8 | 80.0 | 3 | 60.0 | 4 | 66.6 | 9 | 75.0 |
| 8. Index Card Sorting | 0 | | 2 | 28.6 | 1 | 14.3 | 4 | 44.4 | 7 | 77.8 | 6 | 60.0 | 2 | 40.0 | 5 | 83.3 | 11 | 91.6 |
| 9. Tapping 60" Right | 0 | | 1 | 14.3 | 1 | 14.3 | 5 | 55.5 | 4 | 44.4 | 5 | 50.0 | 4 | 80.0 | 6 | 100.0 | 11 | 91.6 |
| 10. Tapping 60" Left | 1 | 20.0 | 2 | 28.6 | 1 | 14.3 | 3 | 33.3 | 0 | | 3 | 30.0 | 4 | 80.0 | 2 | 33.3 | 8 | 66.6 |
| Total No. of Individuals in each Group | 5 | | 7 | | 7 | | 9 | | 9 | | 10 | | 5 | | 6 | | 12 | |
| C.15 Public (109 Girls) | | | | | | | | | | | | | | | | | | |
| 1. Opposites Acc. | 1 | 16.7 | 1 | 9.1 | 5 | 33.3 | 6 | 37.5 | 7 | 43.8 | 8 | 50.0 | 9 | 64.3 | 4 | 80.0 | 5 | 71.4 |
| 2. Sentence Index Ideas | 0 | | 3 | 27.3 | 4 | 26.6 | 6 | 37.5 | 6 | 37.5 | 9 | 56.3 | 10 | 71.4 | 3 | 60.0 | 7 | 100.0 |
| 3. Memory Span | 0 | | 1 | 9.1 | 5 | 33.3 | 6 | 37.5 | 11 | 68.8 | 9 | 56.3 | 13 | 92.8 | 5 | 100.0 | 7 | 100.0 |
| 4. Memory 7–8–9 Nos. | 0 | | 2 | 18.2 | 7 | 46.6 | 7 | 43.8 | 10 | 62.5 | 8 | 50.0 | 13 | 92.8 | 4 | 80.0 | 7 | 100.0 |
| 5. Sub. Pg. 1 Index | 1 | 16.7 | 3 | 27.3 | 3 | 20.0 | 5 | 31.3 | 7 | 43.8 | 11 | 68.8 | 10 | 71.4 | 5 | 100.0 | 7 | 100.0 |
| 6. Sub. Pg. 4 Index | 3 | 50.0 | 0 | | 5 | 33.3 | 6 | 37.5 | 8 | 50.0 | 9 | 56.3 | 9 | 64.3 | 2 | 40.0 | 7 | 100.0 |
| 7. Index Cancellation "a" | 0 | | 5 | 45.5 | 5 | 33.3 | 6 | 37.5 | 11 | 68.8 | 8 | 50.0 | 8 | 57.1 | 5 | 100.0 | 5 | 71.4 |
| 8. Index Card Sorting | 1 | 16.7 | 1 | 9.1 | 2 | 13.3 | 6 | 37.5 | 5 | 31.3 | 12 | 75.0 | 11 | 78.5 | 5 | 100.0 | 6 | 85.7 |
| 9. Tapping 60" Right | 0 | | 3 | 27.3 | 4 | 26.6 | 10 | 62.5 | 7 | 43.8 | 11 | 68.8 | 8 | 57.1 | 4 | 80.0 | 6 | 85.7 |
| 10. Tapping 60" Left | 0 | | 3 | 27.3 | 5 | 33.3 | 6 | 37.5 | 8 | 50.0 | 11 | 68.8 | 7 | 50.0 | 3 | 60.0 | 6 | 85.7 |
| Total No. of Individuals in each Group | 6 | | 11 | | 15 | | 16 | | 16 | | 16 | | 14 | | 5 | | 7 | |

The number and per cent. of those who are above the median score of the working girl of fifteen in nine, eight, seven, six, five, four, three, two, or one of the ten tests indicated, who fail in any given one or more of them. Opposite each test for each group of nine tests above the median, eight tests above the median, etc., the number of individuals who did not score above the C. 15 median is indicated and beside this the per cent. these are of the total number in that particular set.

These are some of the facts established as a result of the application of the tests of the Vocational Guidance Bureau among the inmates of the New York State Reformatory. The significance of the more purely physical tests is more or less directly evident. The relative merits and value of the mental and motor tests—card sorting, cancellation of *a's*, memory of visual-auditory-verbal number series, substitution of numbers in figures, completion of sentences and easy opposites—can best be determined in terms of the normal subject. Which and how many different mental functions they involve and precipitate, which correlate best with maturity and with standard degrees of efficiency, can best be analyzed on the basis of the normal groups of fourteen, fifteen, sixteen, seventeen and eighteen-year-old school and working children and a group of normal working women such as the Maids, when a larger number of them has been tested. There are however, certain facts which become more evident in the case of their application to a less normal group, such as the Reformatory one, which should be noted. The most fundamental of these is that a simple idea, a direction, a perception, does not penetrate and lead out into successful execution for any save the better third of our subjects, unless one speaks more slowly to some, repeats several times to others, and explains and illustrates to yet others, that some of them, even so, cannot be made to comprehend what is expected in even the simplest test. There is no one of these tests in which there is not manifested for the duller two-thirds of our subjects differences in the speed with which stimuli reach comprehension and comprehension leads to execution. This lowered permeability must of necessity result in differences in speed of performance. It need not, frequently does not, lead to equally marked inferiority in the character of the work accomplished once the directions have been made emphatic enough for comprehension. Yet, even after one has made the directions so simple that they are clearly understood, the actual time consumed in perceiving and responding to the various elements in the tests varies enormously from individual to individual and marks off the poorer ones of our subjects

distinctly from the better type of working girl of fifteen, when sometimes the quality of their work would not differentiate them so clearly.

In the card sorting test, there is delay in turning the next card, in perceiving its color, in selecting the right box and in dropping it in; in the *a* test, they are slow about finding the *a*'s in the line, in making a line through them, in satisfying themselves that it is done and in passing on to find the next line; in the substitution test, it takes a long time to fix the form in mind, to carry it to the key, to find the correct number and to put it in its place. Their recall of material to be remembered presents the same spectacle of slowness in the very rate at which a stimulus travels. The actual content of the memory itself is much more likely to be satisfactory. If in recalling numbers which had been read, the writer herself had to wait so long before writing them down, they would meantime be lost. The mind of these women at work is so slow and so narrowed that these number series do not suffer apparently from other thoughts and impressions slipping in between the reading and the delayed writing of the series. The actual complexity and the amount of content which they *can* remember is certainly not safely measured by a simple memory test of the ordinary sort, repeated once, and under conditions that move too quickly for their rate of comprehension. No matter what particular process the test itself may be aimed to measure, their responses are modified—increasingly so the more involved the directions or the more difficult the performance may be for them—by the ever-attendant slowness with which nearly all new circuits of stimulus and response, and some old ones even, are completed in their nervous systems. Each test sets forth the degree to which each has been accustomed to work *unintelligently*. The habitually slow rate at which their minds function leads to unthinking methods of work in the end, and this, in turn, leads around in a circle to make their performances slower than they actually need to be. Another result of their habit of not thinking about what they are doing or about what they wish to accomplish is to make them more clumsy in their methods of work than such a group as the Maids or than they

themselves actually need to be. Unless one watch unceasingly they will begin to work without having understood the directions, without asking any questions, perhaps even having said that they *do* understand *exactly* what it is they are to do. Their unthinking methods are evident throughout all the tests. In the card sorting, they fail to step squarely in front of the box. They stand too far away to secure maximum speed, hold the cards in an awkward fashion and frequently do not use the thumb of the left hand to aid in the sorting. The mere method of handling the cards is often so clumsy and slow as to take almost as long to sort the same number of blank cards as to sort the colors where discrimination is involved. In the *a* test, the substitution test, and those where the response must be written, whereas the Maids drew their chairs up to the table, seated themselves in the most comfortable positions, adjusted themselves so as to secure a maximum of efficiency, a majority of the reformatory group sat in awkward positions, moved up to the table and held the paper upon which they were writing from slipping with the left hand only after they were told to do so.

Under these conditions, "common factors" that tend to make an individual among them who does poorly in one test do poorly in the others, may not mean that she is equally lacking in actual, final ability to remember, form simple associations, discriminate between two figures that differ but slightly, perform simple motor co-ordinations, complete sentences, and think logically enough to produce simple ideas opposite to each other in meaning.

The fact that in many of the foregoing tests these women vary less from the normal in accuracy of performance than in rate of performance is not without its educational significance. Moreover, because an individual's initial effort in such motor tests as cancellation of letters and sorting cards falls even far short of the initial effort of the better type of Reformatory subject, the working girl, or efficient working woman, it does not of necessity follow that she cannot be taught in the end to be as rapid and able a worker as they, though it is certain that it will take a longer time, greater effort and more specialized

training than has heretofore fallen to her lot, to bring her to this degree of efficiency.

The series of rate of learning tests which has been carried on simultaneously with this study proves that almost the dullest among our subjects can attain, and maintain with fair success, a normal rate of performance, but that this state of proficiency is accomplished only with many times the normal amount of practice. It repeatedly happens that a subject who has so completely failed to learn the substitution test in the standard three pages that this simple mental habit seems to be entirely beyond her, does, nevertheless, ultimately acquire it and will succeed in making the substitutions as accurately and as quickly as the standard group if given twenty instead of three preliminary pages. Repeatedly the teachers of the Reformatory school may be heard to say: "I'd give up trying to teach Emma if it were not that Annie and a dozen others who were even more stupid if possible, suddenly began to learn one day and actually read in the third reader and succeeded in cooking and making paper boxes as well as some of the brighter girls."

When one has recognized and satisfactorily explained this slow, yet really existent ability to learn and then has evaluated it in terms of their social requirements and facilities for training, the problem of how to understand and deal with the criminal woman will have been in large part solved. The maximal time that the institution can afford to spend in training any given individual must be estimated and the point in a scale of intelligence must be determined where the duller ones will fail to put their skill, once it is acquired, to good use after they are paroled and discharged. Unquestionably, life demands more than acquired technique in some given performance and exacts upon many occasions quicker powers of adaptation than the slower ones of our group possess.

The Laboratory has secured an exact measure of how long it may take to train typical individuals to do various simple tasks of the sort that will be required in the occupations open to them. There was found to be a very high positive correlation between the speed at which certain typical operations—packing spools, inspecting number combinations, etc.—were done in

the beginning and the length of time required to bring the time of performance down to a fair normal rate. With this fact established, it remains only to determine, as stated above, which subjects will make use of such training, and which ones and how many the institution has the equipment to train.

The value of recognizing that with this type of woman initial inability to comprehend is not a sign of final inability to understand and to accomplish, but rather a measure of her greater slowness to do so, has been demonstrated in a practical way in the method of teaching and re-education employed in the Reformatory school. The method was largely the outcome of Dr. Davis's patience with the women in her charge and of her faith in the worth of putting forth every effort to make the most of each of them. If it was possible, each was to be taught to cook, to read enough to follow a simple recipe, to do simple sums that would enable her to find out how many eggs and how much sugar must be used if but one-fourth of a given recipe was desired. It proved possible in the end to teach most of them these things and the results were sometimes astonishing when compared with the original stupidity.

*Think when you work* is the burden of the teaching in the Reformatory school. The main endeavor is to teach these women who have hitherto either not learned at all or learned each new task blindly without comprehension, that their work will be made easier and they themselves better workers if they will but learn to formulate their problems, to consider the purpose of their endeavor, to think exactly what it is they want to do and then to form a clear idea of the means to be employed in its solution and performance, to consider how *best* they may accomplish it. After a few months in school, results appear. The women begin to do everything better, even new things which they have never done before. It sometimes looks like a striking instance of the transference of training but it is merely the fruit of bringing to their unalert consciousness, by emphasis and repetition and careful selection of problem, the method of successful work, *i. e., to think* when trying to do anything new.

The method has worked so well in the training and development of women already convicted of crime that those in charge

of the classes for defective children in our public schools may well expect to train some of this type, while they are yet children, to be more efficient and thus to minimize that portion of crime that is due merely to lack of training and failure to analyze situations. This method will tend to lessen the number of those who must be classified as feeble-minded if required to learn at the average normal rate, of whom not a few are certain to develop and become reasonably efficient when given special training.

At best strong character cannot be the rule among individuals, two-thirds of whom have less intelligence than that possessed by the average individual among a group of children of fifteen (of whom half are themselves retarded), and almost surely not when they have been too untrained industrially to be efficient and too unschooled socially to have acquired simple, everyday habits of restraint and inhibition. With no greater capacity to appreciate logical relations and consequences than they have, it is not surprising that there has been lacking in their conduct the *motive* and *will* to select for themselves those lines of conduct most reasonable and fortunate, let alone most wholesome. Even if they deliberately disregard ordinary social requirements and standards, still they are too childish to secure for themselves any but the most meager advantages from their activities. They have made a failure of prostitution, even as they have made a failure of everything else. Scanty indeed is the comfort or happiness that has fallen to their lot. They have not the wit to escape fine and arrest and few come to the Reformatory who are not woefully ill-clad and unkempt.

Even the more intelligent third of the Reformatory subjects differ very obviously and unmistakably in stability and emotional control from the group of Maids. The Maids are more self-contained; they consistently employ more mature judgment in the conduct of their affairs. They are more consistent in their aims and evaluation of themselves and their work. They show more perseverance in their undertakings. They are without the superstitiousness and egoism of the general run of Reformatory subjects. To most of them it was a simple matter

to explain what the tests were for and to secure their co-operation. They were glad to do their best and were quite free from selfconsciousness. The Reformatory women, on the other hand, unless they were tested during quarantine, as the Bedford 88 were, when there was no one to mislead them, demanded elaborate and often repeated explanations of the need to do their best, of what the tests were for, etc.

A certain amount of emotional stability is another prerequisite for reformation, and such stability may or may not accompany a fair degree of mental ability. Other tests that will give standard results with respect to these differences in maturity of judgment, absorption in work, self-control, etc., between the normal working woman and the reformatory type must be added. Tracing the star in a mirror and other tests of rate of learning that demand adaptation and persistent attention to the work in hand usually precipitate reactions that are a fairly true measure of emotional control and capacit · to work steadily.

Whatever hope there may be of the development and reformation of these women lies in the firm establishment of saner habits of conduct and in cultivating to the uttermost the intelligence which they have. The problem of the reformability of any given individual is largely a question of the character of the habits of thought and behavior she already has, of their persistence and force on the one hand, and of her emotional stability and her capacity to acquire new habit formations on the other. How the balance lies between these two factors is the fundamental problem in their re-education. As might be expected, many of them establish habits of action, not intelligently, but in a trial and error fashion, reacting blindly to each new situation. This has its advantage in that one set of habits is not apt to inhibit the formation or the functioning of a new set of responses. They are unresisting and willing to learn whatever one wishes to teach them. The same happy-go-lucky capacity to accept unreflectively each day's events as they come, is, however, the real obstacle that one meets in the task of reformation, because, when restored to their former environment, the habits they had previously formed will tempt them back to their former ways of living.

The success the Institution has had in reforming so many of its charges has been due to a variety of things, among which two stand out most clearly. In the first place, it has been due to the skill, patience, and persistence with which even the dullest inmate has been taught better habits of work and play. In the second place, the capacity of this type of woman for personal devotion has been appreciated and fostered. Nowhere does the childishness of these women became so apparent as in their responsiveness to the interest and affection of the officers. Inevitably, the call of old stimuli is often too strong, but when these women mean to do right and do try to keep their paroles, it is usually in part at least, because of appreciation for some person, who has been for them a real ideal. On the whole, it is rather encouraging that so many of them in eighteen months learn to be more scrupulous in matters of personal cleanliness, learn to develop enough resources within themselves to enjoy being alone at times, learn to be responsible in the face of considerable difficulty for some one piece of work, to sew, to mend and to keep regular hours, that to so many there comes some perspective and some realization of the fact that freedom does involve responsibility, that every privilege exacts some service rendered.

In the Institution, the rank and file are uncomplaining, cheerful and generous. They are far more loyal to each other than women or men selected at random elsewhere would be. Loyalty is one of the unwritten laws of the life they have led and their responsiveness to this standard illustrates that school and society may also hope to find ways to instill some of *its* essential and accepted ethical concepts and rules of conduct. They are naturally active. They like to cook and to scrub. They are willing to be taught to do these things. They are full of enthusiasm for out-door work, pitching hay, planting corn, filling the silo, digging potatoes, cutting ice. Even the most excitable and unstable like out-of-door work and will be self-contained and "good" for days for the privilege of making a cement walk. As already stated, they like school under institutional conditions. Of course, they are perpetually talking about their "freedom" and are restless to be paroled. They

are unreasonable at many points and are punished day in and day out for childish quarrels or unreasonable outbursts of temper. But, on the whole, two-thirds of them are tractable and responsive and some appreciable number of them at least, other things being equal, may be trained to be efficient and be taught a reasonable measure of self-control. Perhaps this would be true for more of them, if their sentences were longer. As this work has proceeded the writer has felt increasingly sure that it would have been true for a much higher per cent. if each girl could be put through a careful examination in a clearing house at the time of her first offense, sentenced in accordance with her needs and capacities, and then have been followed up until each had received the discipline and the training found to be essential to the development of her self-control, industrial efficiency and good citizenship.

# APPENDIX

TABLE 73.

BELOW-GRADE GROUP.

| No. of Inmate | Age at leaving school | Alleged reason for leaving | Age when first went to work | No. of jobs held during first 3 years | No. weeks work record | Average wage per week | Amount of wage given to parents |
|---|---|---|---|---|---|---|---|
| 38 | 13 | To keep house for father. | 15 | 2 | 15 | 4.25 | 0 |
| 65 | 15 | Needed to go to work. | 15 | 3 | 13 | 3.50 | ½ |
| 122 | 16 | Went 6 months to technical school. Hated it. People wanted her to go on. | 16 | 3 | 65 | 7.00 | 0 |
| 123 | 12 | Mother wanted her wages and work. | 13 | 6 | 52 | 2.50 | All |
| 124 | 13 | Left to earn her living. | 13 | 1 | 156 | B.+2.00 | X[1] |
| 8 | 13 | Wanted to work. | 13 | 2 | 156 | B.+4.25 | X |
| 22[2] | 14 | Didn't like school. | [3] | | | | |
| 51 | 14 | Liked school but wasn't well. | 14 | 1 | 156 | 0 | None |
| 56 | 14 | Didn't like school. | 16 | 1 | 156 | 7.00 | X |
| 92 | 14 | Out a lot. Didn't like school; didn't like to work either. | 15 | 2 | 13 | 4.00 | X |
| 101 | 14 | Very bad eyes made school hard. | 14 | 2 | 65 | 4.50 | X |
| 112 | 11 | Because of St. Vitus Dance. | 11 | 2 | 156 | 4.00 | 0 |
| 127 | 13 | From 2 to 13 in orphan asylum, St. Joseph's Home in Brooklyn. At 13 sent home to help her sister. | 15 | 2 | 156 | 6.50 | 0 |
| 24 | 14 | Didn't like school; couldn't learn. | 14 | 1 | 104 | 6.00 | All |
| 29 | 13 | Hated school. | 14 | 1 | 104 | 12.00 | X |
| 42 | 14 | Family large and she needed to go to work | 14 | 1 | 104 | B.+2.25 | X |
| 87 | 13 | Father drank. Kept her out always. | 15 | 2 | 156 | 5.25 | All |
| 102 | 14 | Hated school; wouldn't go; couldn't learn. | 14 | 2 | 64 | 5.00 | All |
| 115 | 13 | On account of eyes. Liked school. | 16 | 1 | 4 | B.+2.00 | 0 |
| 20 | 14 | Didn't like school; couldn't learn. | 14 | 1 | 12 | 7.00 | 0 |
| 53 | 14 | Played truant and left as soon as she could. | [4] | | | | |
| 81 | 11 | Family made her go to work. | 11 | 2 | 52 | 5.00 | All |
| 85 | 14 | In Catholic Protectory. They took her out of school at 14. | 16 | ? | 104 | 4.00 | All |
| 91 | 12 | Didn't like teachers; couldn't learn; hated it. | 14 | 5 | 156 | B.+4.00 | 0 |
| 104 | ? | Too feeble-minded to tell her story. | ? | ? | ? | ? | 0 |
| 114 | 13 | In special class; couldn't learn. | 14 | 1 | 8 | 5.00 | All |
| 18 | 0 | Never went to school. | [5] | | | | |
| 35[2] | 0 | Had epilepsy and never was sent to school. | [6] | | | | |

[1] In this and the following tables X indicates facts could not be ascertained; ? that the subject was uncertain of the data.

[2] Subjects 22 and 35 are *Lizzie Brown* and *Laura Lee*, two of the 8 women of the county study, referred to page 1.

[3] Never worked.

[4] Home 5 years.

[5] Too dull to tell it straight.

[6] Too feeble-minded to tell her story.

TABLE 73—*Continued*

| No. of Inmate | Age at leaving school | Alleged reason for leaving | Age when first went to work | No. of jobs held during first 3 years | No. weeks work record | Average wage per week | Amount of wage given to parents |
|---|---|---|---|---|---|---|---|
| 40 | 0 | Never went to school. Stayed home and helped mother make lace collars. Earned $2.50 a week. The mother died and she went to live with a sister and to work in a laundry. | 13 | 1 | 52 | 8.00 | All |
| 44 | 0 | Never went to school. | 14 | 1 | 36 | 6.50 | X |
| 64 | 0 | Never went to school. Parents died when she was 2 years old and her sister gave her a home. | 13 | 1 | 104 | B.+1.50 | All to sister. |
| 128 | 0 | No school in Russia. Came to America at 14. | 14 | 3 | 130 | X | X |
| 108 | 0 | Never went to school. | 10 | 3 | 156 | B.+ .19 | All |
| 116 | 0 | No schooling. Was put in school in institution. Couldn't learn. | [7] | | | | |
| | | **VTH GRADE GROUP** | | | | | |
| 2 | 16 | To work; needed money. | 16 | 2 | 52 | 6.00 | All |
| 9 | 14 | Didn't care for school. Wanted to work. | 14 | 3 | 143 | 10.00 | [8] |
| 30 | 15 | Didn't like school. Stopped to get a change. | 15 | 3 | 117 | 5.50 | All |
| 34 | 14 | Didn't like school. Wanted to work. | 14 | 3 | 156 | 5.50 | 0 |
| 36 | 13 | Put out at work by Dominican Sisters who brought her up at 14. | 14 | 3 | 134 | 6.00 | 0 |
| 39 | 13 | Brother sent for her to come to America to work. | 14 | 3 | 86 | B.+5.00 | 0 |
| 70 | 17 | To support herself. Parents dead. She went to Holy Cross School, an especially good Catholic school. | 17 | 3 | 85 | B.+3.00 | [9] |
| 74 | 12 | Aunt kept her home to help with work. | 15 | 2 | 156 | 3.40 | 0 |
| 82 | 14 | To go to work when father was killed. | 14 | 2 | 104 | B.+4.00 | 0 |
| | | **VITH GRADE GROUP** | | | | | |
| 3 | 14 | Wanted to work. | 14 | 2 | 43 | 4.00 | X |
| 5 | 12 | X | 12 | 3 | 156 | 7.50 | X |
| 7 | 14 | Ran away from school. Stopped after leaving Hudson. | 17 | 3 | 29 | B.+3.00 | X |
| 10 | 13 | Parents died when she was 3 and she was put in Home for 6 years. | [10] | | | | |
| 13[11] | 15 | Needed to help out; so many in family. | 15 | 1 | 104 | B.+3.00 | All |
| 21 | 15 | In school when sent here. Didn't like school. | [12] | | | | |

[7] Too feeble-minded to tell story.

[8] All to mother.

[9] Paid board to uncle.

[10] Has never worked.

[11] "Esther Wenn," another of the related group of the Community Study.

[12] Never worked.

VIth Grade Group—*Continued*

| No. of Inmate | Age at leaving school | Alleged reason for leaving | Age when first went to work | No. of jobs held during first 3 years | No. weeks work record | Average wage per week | Amount of wage given to parents |
|---|---|---|---|---|---|---|---|
| 25 | 15 | Didn't like school. Left to go to work. | 15 | 2 | 12 | 4.00 | X |
| 28 | 17 | To go to work. | 17 | 1 | 156 | B.+4.00 | Some |
| 55 | 17 | To help step-mother; didn't like school. | *22*[12] | *1* | *33* | *5.00* | *0* |
| 57 | 14 | Didn't like school. | 17 | 3 | 12 | 10.00 | 0 |
| 63 | 14 | Didn't like school. | 15 | 1 | 78 | 4.25 | All |
| 76 | 14 | To work. Didn't like school. | 14 | 2 | 156 | 4.00 | 0 |
| 89 | 15 | School got too hard for her. | 15 | 3 | 8 | 5.50 | All |
| 93 | 14 | To help grandparents. | *17* | *1* | *52* | *5.00* | |
| 103 | 16 | Left to go to work. Didn't like school. Too old to go longer. | 16 | 5 | 104 | 5.00 | 0 |
| 111 | 14 | Finished country school. | 14 | 1 | 156 | B.+5.00 | 0 |

VIIth Grade Group

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 12 | 16 | Didn't like school. | 16 | 2 | 104 | B.+3.25 | 0 |
| 14 | 15 | Left to work. | 15 | 1 | 52 | 6.00 | X |
| 26 | 14 | Left to work. | 14 | 2 | 90 | 7.00 | 0 |
| 31 | 19 | Left to take up millinery and dressmaking. | 20 | 3 | 104 | 7.00 | 0 |
| 32 | 13 | Left because angry with teacher and wanted to work. | 14 | 3 | 60 | 5.00 | All |
| 52 | 14 | Didn't like school. Always wanted to work. | 14 | 1 | 78 | 8.00 | X |
| 66 | 14 | Wanted to work. | 14 | 1 | 156 | 5.00 | X |
| 67 | 14 | Didn't like school. | 14 | 2 | [14] | None | 0 |
| 69 | 13 | Had St. Vitus Dance. Liked work better, too. | 15 | 1 | 78 | 3.00 | All |
| 71 | 15 | Wanted to get away from aunt who was too strict. | 15 | 2 | 52 | 20.00 | 0 |
| 72 | 12 | Didn't like school. | 13 | 3 | 60 | 7.00 | X |
| 73 | 15 | Didn't like school. Wanted to work. | 15 | 2 | 156 | 12.50 | 0 |
| 94 | 15 | Too old to go to school. Preferred to work. | 15 | 3 | 21 | 6.50 | [15] |
| 106 | 14 | To work. Didn't care for school. | 15 | 2 | 52 | 3.50 | 0 |
| 109 | 16 | Left business college. It was too hard. | 16 | 2 | 52 | 5.25 | 0 |
| 117 | 14 | Didn't like school. | 14 | 1 | 8 | 7.00 | 0 |

[12] Those records italicized are instances where the subject did not go to work until more than three years after leaving school.

[14] Off and on only.

[15] None and father paid room rent besides.

VIIIth Grade Group

| No. of Inmate | Age at leaving school | Alleged reason for leaving | Age when first went to work | No. of jobs held during first 3 years | No. weeks work record | Average wage per week | Amount of wage given to parents |
|---|---|---|---|---|---|---|---|
| 16 | 17 | ? | [16] | | | | |
| 23 | 14 | Had been staying out late. Father put her in Catholic Protectory for 5 months. | 15 | 3 | 64 | 6.50 | 0 |
| 33 | 14 | Was in Brooklyn Industrial School and at 14 they sent her to uncle who put her out to board where she was ruined. Child born at 16. | [17] | | | | |
| 45 | 14 | To work. | 14 | 3 | 52 | 4.25 | 0 |
| 78 | 14 | To work. | 14 | 1 | 156 | 1.00 | 0 |
| 83 | 14 | Had scarlet fever and then went to work; almost had St. Vitus Dance. | 14 | 1 | 104 | 10.00 | 0 |
| 84 | 16 | Had miscarriage in school. Finished one year in High School. | [18] | | | | |
| 90 | 17 | Wasn't passing high school courses, so left after one and one-half years. | 17 | 2 | 52 | 9.00 | 0 |
| 95 | 16 | Began running wild; had been immoral steadily since 13 years old. | [19] | | | | |
| 97 | 14 | Studied stenography and found it too hard. | 14 | 2 | 104 | 5.50 | [20] |
| 100 | 16 | Wanted to work. Had passed first year of High School. | 16 | 1 | 156 | 6.00 | All |
| 125 | 12 | Wanted to be an actress. | 15 | 3 | 25 | 8.00 | |
| 129 | 15 | Left after completing second year of high school to help support family. Had attended high school for three years. | 15 | 2 | 15 | 4.00 | X |

[16] Has never worked.

[17] Has never worked.

[18] Did not work until after Parole from first sentence.

[19] Never worked.

[20] $2.00 to mother.

## CONDENSED WORK-HISTORY.

*Below-Grade Group.*

38. (1) Silk factory, wage $4.50 a week. Stayed home one week and was discharged. Stayed home and worked for "a long time—over a year." (2) Nurse maid. A man she had known four months persuaded her to steal from her mistress. He was to pawn the things and marry her. Instead he took them, lived with her a week and ran away. She secured another position as nursemaid after two weeks. Was met by the mistress from whom she had stolen, when out with her new charge, and was arrested. She pleaded guilty to Petit Larceny. Has had no previous arrests.

65. (1) Domestic in boarding house. Left to work for rich New Yorkers in their summer home. When they returned to city, she lived at home and (2) worked in a cigar factory after being idle five months. She met a brakeman on the West Shore R. R. by whom after a few months she became pregnant. He left town and she went to the County House for the birth of the baby. There she had typhoid fever and was taken to the City Hospital. A social worker, realizing how feeble-minded she was, sent her to the Reformatory as soon as she was well enough. The baby died of summer complaint its first summer at Bedford. The matrons here say that this girl cannot do housework, that she is slovenly and won't even comb her own hair, that she quarrels with the other girls over insignificant trifles, and can only do outside work.

122. (1) Siegel Cooper's. Left after 6 months as a result of a quarrel with the floorwalker. (2) Addressed envelopes in an office at $8 a week, leaving because she got tired of the job. (3) Was a shipping clerk in a neck-wear department and after 3 months left because the girls were jealous of her popularity with "fellows" and it made her angry. She stole a muff "because a girl asked her to" and was put on probation. She then ran away from home for five days and was sentenced to Bedford. She tells very contradictory stories, has disintegrated rapidly since her reception, and has recently been transferred to an insane asylum.

123. A childish little creature, who is certainly not guilty of her mother's charges. She is too dull and nervous to remember things very accurately and contradicts herself absurdly. The only thing that one can be sure of is that the mother and stepfather have been hard drinkers and very cruel to the child. The mother has secured one job after another for her and then made trouble in each by demanding the wages in advance. The child was arrested on the complaint of the mother. She had run away because they were unkind to her.

124. (1) Did housework in Vienna. Left to come to America. (2) Worked in a factory for 7 years until her mother's death, during which time she went to night school. Then, because there was more money in prostitution, she deliberately went on the streets and was arrested for soliciting when she took a detective into a colored house of prostitution. Her expression is dull, but her voice pleasing; she is fairly intelligent, and mature in her point of view; likes the street life and means to return to it when free.

8. (1) Chambermaid for 2 years. Left because she wanted more money. (2) Worked in the family of the son of her first employer. Was ruined at 16 and was "disgusted" and ran away to enter a life of prostitution. Some years later for 8 months she was cashier in a drug store in Washington at $8 a week, but this is the only work she has done since she was 16. Her people are thoroughly respectable and are greatly distressed over her conduct. They had thought that she was working legitimately.

22. This girl is the daughter of a small farmer and has always lived at home and never worked. She was sent to the Reformatory by her family when they found that she was pregnant for a second time illegitimately, because they were ashamed to have the child born at home and because they felt that she must be punished. The first time she was pregnant, an aunt produced an abortion. This time the child was born at Bedford. The girl is good-natured, ready and willing to work to the extent of her ability. She is not bright enough to learn to cook. The matron says she keeps herself and her baby clean, that she is truthful and not sly. Her left arm is crippled with "rheumatiz" which the doctor says is the result of a gonorrhoeal infection.

51. (1) Worked in her uncle's store as a clerk for 3 years, receiving no regular wage. She got tired of the work and left. (2) Worked in a nightgown factory on a power machine for a year at $8 a week. Left on account of her eyes. (3) After 3 months at home, she became a waitress in a summer hotel at $5 a week and the tips sometimes amounted to $3 a day. She was at home all winter and married soon after. She was a sex offender first at 13 with a man whom she met at a bathing beach. She has a good home. A year after her marriage she left her husband and went on the streets where she was earning from $50 to $60 a week. Her stories to various members of the Institution staff do not coincide, and it is apparently hopeless to get the exact truth. She has been in the Florence Crittenden Home for 2 days and in the Workhouse 6 months. She was arrested for soliciting and sent to Bedford as a common prostitute.

56. (1) Worked in a knitting mill for 9 years. When she was 23 years she had an illegitimate child by a friend of her father's. After the baby was born, her sister "taunted" her. (2) She then did housework but left after 10 months, because she was "so lonesome." (3) She then took another position as a domestic, which she left after 3 months to go where she could have the baby with her. (4) In the next position as domestic she became pregnant by the man of the house. When she was arrested she was told to answer "yes" to everything; this convicted her of adultery and she was sent to the House of Good Shepherd to await Bedford.

92. (1) Worked in a doll factory one week at $5. Left because she did not like it. (2) Worked in a sign factory for 3 months at $4.60 a week. In the meantime she had begun to run around with a girl whose influence was not good and she stayed out until after ten and was so disobedient that her father put her in the Brooklyn Training School at 13 years of age for 8 months. When she came out she was still defiant and wayward, so she was put in the Wayside Home. There she was so ill-behaved that they could not keep her. She was finally put on probation and then became a sex offender with a boy she had known four years. He was willing to marry her, but, mistakenly perhaps, the probation officer insisted upon her being sent here.

101. (1) Ran away from her first job as errand girl after 1 year, when she was 15, with a "lover." She ran away with him because her stepmother "beat her up" and was unkind to her. During this time her child was prematurely born. Her father found her and had her sent to the House of the Good Shepherd for one year and six months. (2) After leaving the House of the Good Shepherd she worked as a domestic for a year, when she met and married an Italian who put her on the street and forced her to earn at least $10 a night. She was soliciting when arrested. She has defective vision, is a mouth breather, has a high arched palate, defective speech, and Hutchinson teeth. She is a frail girl with a weak back. Her dullness is in part a result of physical handicap.

112. (1) Was an errand girl for 2 years. She stayed out too late one night and did not go back. (2) She was a child's nurse at $14 a month for a year.

Was a sex offender first at 14. The man afterwards married her. He was a gambler and was later sent to State's Prison for a year. She went back to him after his release, but he wanted her to go on the streets and she refused. At the birth of her baby the doctor gave her morphine and her husband told her what it was and how to procure it. Her mother was cook for one of the wealthiest families in New York, and when Anna was a little girl put her in a day nursery. She ran the streets and got into all sorts of wrongdoing. The mother was strict with her and warned her not to be immoral. The mother felt the need of putting her into a correctional institution when she was 13 but did not succeed in getting her in. The matron says that she is a good worker, that she gets along well with the girls and will make a fair housemaid. She was arrested for petit larceny. She says she had pawned a locket a man had given her to get money for morphine. He was angry because she refused to marry him and when he discovered about the locket he had her arrested. She has been living at home during the past 6 years keeping house for her father and taking odd jobs in a button factory to earn money for morphine. She claims not to have been immoral since her marriage.

127. (1) Worked in a factory for a year. Reason for leaving unknown. (2) In another factory 2 years. Reason for leaving unknown. She then became a domestic and after a year was a sex offender for the first time. She had known the man for 2 years. Her sister discovered her relations with this man 8 months later and had her sent to the House of Good Shepherd. She had become infected and was sent to the Flatbush Hospital for an operation and from there to Bedford. She is very unclean about her person.

24. This girl is a clear-voiced, brown-skinned, black-eyed little thing. Time and money mean nothing to her. She is suspicious and easily frightened; she is high-strung emotionally; is very dull and further handicapped by partial deafness. (1) She worked in a cotton factory steadily for 2 years. One day she became afraid of a man who followed her, ran from him and got lost. She was taken to the Raphael Home, where she stayed for 11 months. Upon her return home her mother insisted upon her marrying "an old man 39 years old." In the meantime a friend of hers induced her—practically forced her—to go to Chicago with him. Her brother came and took her back; the man was sent to Sing Sing and the girl to the Gerry Society, thence to a hospital for treatment, and then to Bedford for associating with vicious persons. She has since been transferred to Randall's Island.

29. (1) This girl claims to have been in a dressmaking shop for 2 years. Was a sex offender for the first time when 17 under a promise of marriage. She then ran away from home. After 8 days was found by her people and sent to the House of the Good Shepherd. After 5 months she was sent to the Metropolitan Hospital to be treated for gonorrhoea. Escaped from there after a month and went to a married sister who was so strict with her that she ran away again with a man who wanted her to go on the streets. She was with him in an opium den under the influence of the drug when arrested.

42. (1) Domestic on a farm. Was a continuous sex offender with one of the farm hands. Her father finally heard of it and tried to arrest the man. She was taken home. (2) She went to Poughkeepsie to take a place as domestic and because the family was not in became frightened and told her story to an Italian at the station. He took her to a hotel with him, bought her some shoes, and finally paid her way home. She told her father about it and he had her committed to Bedford after a short sojourn in the Albany Shelter.

87. The father was a gambler and a drunkard, very abusive and dangerous. The mother and children worked at wig-making. The father was so violent that finally the mother left him. Mary tried to keep house for him. The Gerry Society forced him to send the children to school part of the time.

Mary couldn't stand it, so she ran away. She was put in the House of the Good Shepherd on the Hudson for a year. (1) Her mother then took her and she went to work as an errand girl, where she stayed for 2 years. (2) After that she worked in a factory because she got a better wage. An uncle was very dictatorial and she finally ran away again. She was moral until she met an Italian with whom she went to live. This was several years ago; he has supported her and she has not done any work since. He contracted gonorrhoea and she was infected. He gave her money to go to New York for treatment. She spent the money for a good time and then was frightened and felt that she must earn more, which she endeavored to do by prostitution. The first man she solicited was a detective. The story is probably true.

102. (1) Worked in a rope factory at $5.50 a week. She left after 3 months because the work made her ill. (2) Worked in a cigarette factory for a year. Left to run away with a "lover." After a while her baby died and she grew tired of the man. She ran away with some girls and began soliciting. She has been arrested twice, sent to the Island the first time and put on probation the second time. She was given work in a candy factory, but stayed only 2 months. For breaking this parole she was sent to Bedford.

115. (1) A domestic. Left to live at home; the work was too hard and the pay too little. At 14 she met a woman who took her on an excursion and introduced her to a man. Her first sex offense was the result. She continued to consort with him and other men whom this woman introduced to her. She had an illegitimate child and since the birth of this baby has taken money for prostitution. She was arrested because she and this woman stole some clothing from a clothes line.

20. (1) Pulled bastings in a shirtwaist factory. Was too slow and was laid off. Was idle for a year. During this time she became intoxicated while out with some "girls and fellows." Her first sex offense was the result. After this she became a prostitute. She was married 3 years ago to an Italian who earned a good living. She kept on soliciting and was arrested by plain clothes man. She has been arrested seven times, was sent to Blackwell's Island for five to fifteen days each time.

53. Lived home 5 years. Didn't want to work—wanted "freedom." The mother wouldn't let her stay out after nine o'clock, so she ran away to live with another girl whose mother let the girls do whatever they liked. At a dance hall she met a man with whom she drank until intoxicated. Her first sex offense followed. She continued to meet this man for over a year, when she married another man. After a year she grew tired of her husband and home and was persuaded by a girl friend to go back to the street life. She lived for a while with a ship's carpenter, but quarrelled with him shortly and went to soliciting again. She has been sent to the Island twice. While out looking for her brother one evening in company with a girl who had been drinking too much and was well known on the streets she was arrested and sent to Bedford.

81. (1) Worked as a domestic for a short time and then for a change (2) in a factory. The father drank and abused the mother and children. Finally the mother went to live with another man who was kind to her. The father then shot himself. The girl was 11 at this time. Her mother married her second consort who abused his stepchildren. At 13 this girl was assaulted by a man she was "going with." A little later was a sex offender with another man and at 14 married to still another because she wanted a home and because she feared she was pregnant. He drank and wouldn't buy her necessary clothing, so after two years she left him. She then solicited because some girls told her it was foolish to live with a man who would do nothing for her. She made from $5 to $6 a week. After 3 months of this life she became in-

volved in a murder trial, confessed to be a prostitute, and was sentenced to Bedford.

85. The father drank and was abusive. The mother left him when the girl was 10 years old. She tried to keep house for her father but she became unruly and was associating with such undesirable companions that the father put her in the Catholic Protectory when she was 11. At 16 she went to live with an aunt and (1) worked in Macy's at $4 a week. Her aunt was too strict, so she ran away a few months and worked (2) in a restaurant and (3) in various other places for a short time. She can not tell anything definite about these jobs. Thinks it was two years when she met a "sporting man" who told her about women who earned money on the streets and who tried to persuade her to live with him. During this time she became a drunkard. After two years she left this man and went on the streets. She loves the excitement of it. When she hadn't been drinking too hard, made from $8 to $60 a week.

91. Will tell little of herself. (1) Was a waitress for a year. Left because the work was too hard. (2) Worked in a delicatessen for a year. There were too many bosses, so left. (3) A waitress in White Plains in a private house. Left because the woman couldn't afford to keep her. (4) In a paper box factory in New York City for 2 months. Brother came and took her home. (5) Packed olives for 2 months. Ran away and has never worked since. Has been finger-printed seven times. Was sentenced to Bedford once before and discharged. Sentenced this time for soliciting.

104. Held a "lot" of jobs for a short time each; discharged each time until finally had no place to sleep but the parks. Her parents were both dead. The girl is unable to tell any facts but these. Has been transferred to Matteawan. Was feeble-minded before she became insane.

114. Held one job as domestic for a few weeks. Was a sex offender first 2 years ago with a man whom she knew fairly well. She lived with him for 2 months. He died and she went on the streets because the girls told her that it was easy to earn money in that way. She made $4 a week. Had syphilis badly when received at Bedford.

18. Too dull to tell about her working history. She was cook at $8 a month in a restaurant for a time. She was a sex offender first a year and a half ago. Two months after her child was born the man married her. Shortly after some girls pointed out to her the "beautifully dressed women in houses of prostitution" and persuaded her to leave her husband. One girl took her to an Italian saloon. It was raided. The saloon keeper's wife took her out on bail and she earned money for her by prostitution until her trial. The judge sentenced her to Bedford.

35. This girl is too feeble-minded to tell her story. She is related by blood or by marriage to eight other women who were in the Reformatory at the time of her arrest. Something of her history will be given elsewhere.

40. Never went to school; stayed home to help her mother make lace collars. Earned perhaps $2.50 per week. The mother died and the girl went to live with her sister and (1) to work in a laundry. She met two girls who introduced her to an Italian tailor with whom she went to live. After 9 months she went home with a girl whom she knew. This girl "kept a house where white girls lived with colored men." It was raided while she was there and she was sent to Bedford as a common prostitute.

44. (1) Worked in a tailor's shop for 9 months, when she left to be married at 15. After 2 years her husband died and she (2) worked for a little while in a canning factory at $5 a week. After a few months she left to live with a machinist. The officers came in and arrested her there.

64. Never went to school. Parents died when she was 2 years old, and her sister gave her a home. (1) Worked as a domestic; people beat her and

were very hard to please. When 15 she was on the street crying because she had stayed out a little later than her mistress allowed. A woman comforted her and took her home to supper. That night she gave her into the hands of a man who took her to New York and put her in a sporting house. She lived with the man and supported him for five years. Once during this time she left him and married, but she left her husband in two months to return to her "lover." She earned from $100 to $200 a week. The man ill-treated her, "It's good to have a fellow." She has been seven times to the workhouse, five times discharged and once fined.

108. (1) In Germany worked as a nursemaid at $10 a year. After a year she wanted more money so (2) she minded cows at $18 a year. Then (3) did farm work for a higher rate, *i. e.*, $20 a year. Left to come to America to earn some money. (4) Was a domestic for 4 months but the people were mean. (5) Was a domestic for 7 months, but was discharged because the lady wanted a better cook. (6) Domestic for 1 month; left because the people moved to the country and she would not go. (7) Nursemaid for 5 months, left because she stayed out late at nights and was discharged. (8) Nursemaid for one month; she stayed out late nights and was discharged. Claims not to have been a sex offender except with one man whom she had arrested. Was arrested while out in a park apparently homeless. Too dull to explain her case satisfactorily, and she was sent to the Reformatory as a vagrant.

116. Never went to school. Was put in school in the Institution school, and could not learn. Is too feeble-minded to give a coherent story. Was married 6 years ago and has continued working in a factory, earning $5 a week. Maintains she asked the judge to send her here 2 weeks after her husband deserted her.

128. No school in Austria. Came to America at 14. (1) A domestic for 7 months, but work was too hard and she did not like the children. (2) Domestic for 5 months; family moved. (3) After 6 months of idleness went into a candy factory where she remained for a year and a half, when she got in with bad company and has since lived in a house of prostitution, earning from $70 to $105 a week. She has been arrested twice, spent 6 months on Blackwell's Island, and the last 6 months in Bellevue Hospital.

*Fifth-Grade Group.*

2. (1) Carpet factory. Left because she had pneumonia. (2) Silk mill as weaver, left to go to a dance. Ran away from home and was arrested by family for vagrancy. Had been a prostitute for some time and had stolen quite a little money from her sister besides.

9. (1) Rubber factory. Discharged after a year for insubordination. (2) Gum factory. Left because work was too heavy. (3) Threadmill—too noisy. Stayed home and kept house for her mother. Was sex offender first at 18. Two years and a half ago she ran away and has been leading "a sporting life" and has never worked since. She was arrested for soliciting on New Year's Eve.

30. (1) Auditing Department in Fourteenth Street Store. Left to get more money. (2) Auditing but got no more money and left at the end of 6 months because tired of work. Was home 8 months. (3) Saleslady, left to be married after 3 months. Was a sex offender first at 17. She lived with her husband 4 years. He was a cocaine fiend and carried the drug to women in the Tombs. She was in the White Plains Temporary Home from 5 to 10 years of age, and in St. John's Hospital, Yonkers, for hip disease at 3 years of age; at 13 she fractured her hip and was in hospital for 3 months.

34. (1) Shirtwaist factory; left after 7 months because she did not like the work. (2) Quilling in a silk factory, left after 2 years because she quarreled with the family. She then came to New York and (3) was a waitress for 6 months. Left to go home. After this she held two jobs for a very short time each. Was a sex offender at 17 and shortly after began to support a man by prostitution. She was paroled from Bedford at house work after 14 months to an absolutely ideal place because of her father's death and the poverty of her family. She stayed only a little while and ran away.

36. (1) A domestic for 6 months. Left because too lonesome and too little pay ($6.00 a month and board). (2) Domestic for 1 month, left for the same reason ($10.00 a month and board). (3) Tobacco factory where she worked for a year and a half at $4.50 a week. She was ruined at 17 by the son of her mistress. She left work and went with some girls she knew and began to solicit. For the last year she has been supporting a man by prostitution; finally he forced her to steal. He beat her when she did not bring home enough money to suit him. Apparently she was in no way discontented with her lot.

39. (1) Domestic 1 year. Left because she was lonesome. After being idle for 3 months, (2) was a domestic for 6 months. Left because woman was "too cranky." After 4 months of idleness (3) was a chambermaid in a private family. She quarreled with the "lady," ran away, was arrested and sent to the House of the Good Shepherd for 2 years by her family. After this she took a place, but left almost at once to live with a man who led her into prostitution. She made about $25 a week. Was pregnant when received at Bedford.

70. (1) In a mill where men's underwear was made. Left after 2 days because she did not like the work. (2) Was a domestic. Left after 14 months because she wanted more money. Tells several contradictory tales to everybody who interviews her. (3) She was a domestic when arrested and had stolen jewelry from her mistress and had bought things at the store and charged them to her. She had an illegitimate child and was confined in the New York Foundling Hospital.

74. (1) Cotton mill, left after 2 years because her father took her money and drank it all up. (2) Electric factory. Left at the end of a year to leave home because her father was so brutal. She straightway got in with bad company. Was a sex offender at 15, and after 3 years she was married to a sailor, but lived with him only a short time when he was ordered away. During his absence she lived with other men.

82. (1) Left domestic service at the end of 2 years to be married. Her husband was a good man. He died after 4 years and she boarded with women who were soliciting. She claims that she was never immoral and that her arrest was merely a matter of spite work. She has been very good in the Institution and there is some basis for suspecting that her statements are true.

*Sixth-Grade Group.*

3. (1) Made infants' dresses and earned from 30 cents to $5.00 a week. After 6 months she ran away with a man she had known for some time. Her family found her and sent her to the House of the Holy Family for a year. Thereafter she came home and (2) worked as an errand girl for 5 months when a man persuaded her to run away with him. Three years later she was arrested for soliciting.

5. (1) Cash girl in Ehrichs for 18 months at $3.25 a week. (2) Learned the book-binding trade and then earned $14 a week. When trade was dull (3) worked for the National Biscuit Company and earned $7.50 a week.

She was a sex offender from 15–16 continuously and her mother sent her to the House of Mercy. She was well behaved after that and was married in 1908. After 3 years she left her husband to go on the streets. She was arrested for loitering. Had been arrested several times before and this time was sent to Bedford.

7. (1) Was adopted from an orphan asylum, but was so immoral when only eight that she was returned to the orphan asylum and transferred to the Hudson Training School. She was afterwards taken back by her adopted mother who died a year ago. Sunday-school teacher found her a domestic position which she held for several months but was not strong enough to remain. She became pregnant and was sent to Bedford.

10. When 3 years old her parents died and she was put in a temporary home for 6 years. Has never worked. Her adopted parents were always good to her. Not long ago she had saved up $22 with which she ran away to Yonkers because she "just wanted to." When the money was gone she became frightened and went to the house of an acquaintance who happened to be away. She took a suit and a hat and went home with them, whereupon she was arrested and sent to Bedford.

13. She left school because she was one of 16 children and needed to help. (1) Took a position at house work. Stayed only 6 months because the family did not need a girl in the winter. (2) She did two washings a week at home for $3.00. After 6 months (3) went back to her first position. Stayed six months when the woman got another maid. (4) Was a domestic for 7 months. Left because pregnant. She was ruined at 17 by her own father by whom she has had 2 children.

21. Has never worked. She was in school when sentenced to Bedford. Was arrested by her parents when just 15 years old.

25. (1) A domestic at $22 a month, stayed only a few weeks when she ran away with a girl to Coney Island. Her mother sent her to the House of Mercy. After this (2) she worked in a carpet factory for 2 months when she met the girl with whom she had first run away, and again tried to run away. Her mother then sent her to the House of the Good Shepherd for a year. After that she behaved and did house work for a year until she met a man whom she liked so much that she went to live with him. He put her on the streets and she gave him all she earned, about $35 a week. Was arrested for soliciting a detective.

28. (1) She worked for 3 years in a hotel where actors of third-class shows board and where farmers put up their horses when they come into town. Her father let her work in this hotel not realizing that it was dangerous. A keeper of a disorderly house came to the hotel for breakfasts and told her that it was foolish to work for so little money. The result was that for a year she lived in a house of prostitution. There she met a man with whom she went to live. He is a good machinist and wanted to marry her, but she has refused. She was arrested while talking to a man on the street whom she claims that she knew.

55. After leaving school she stayed home and helped her stepmother for the first 3 years. She was then married. Her husband—an Italian—died when her baby was one week old. She then worked (1) for 8 months in a restaurant in Poughkeepsie. She got homesick and went to New York where she was shortly arrested for soliciting and put on probation with her mother. In a few months she came back to New York and was re-arrested as a common prostitute and sent to Bedford.

57. After leaving school at 14 years she ran away with another girl and two men. Mother found her and sent her to the House of the Good Shepherd for 5 months. She was paroled and (1) worked for an uncle for 8 months

for her board and clothes. Then her mother sent her to school to learn stenography. After 3 months' trial she gave it up and went on the streets where she was caught and paroled. She married a man who was absolutely worthless and (2) she then worked in a cabaret at $25 a week. Left because her mother made trouble for her. She was living with a "lover" at this time. (3) Worked in a Five and Ten Cent Store for 4 months. Left to return to the streets. She earned $40–$50 a week by prostitution besides singing at a cabaret several nights a week. Gave her earnings to her lover. She was arrested for soliciting and sent to the Florence Crittenden Home from which she escaped by jumping out of a second story window. She went on the streets again and was re-arrested in 3 days and sentenced to Bedford.

63. (1) Worked in a canning factory for a year. Gave her money to her father. At 16 she was forced to be immoral by a boy whom she knew. The father had the boy arrested and the girl was sent to a sister who is a missionary in Kansas City. She was placed to board in Jefferson Home. She got in with bad company and stayed out very late until the Home sent her back to Waverly House where she stayed for 4 months. Was treated for thyroid gland by Neurological Institute. Had an operation for appendicitis and was discharged on probation. Returned home and (2) was employed in office work. Was a constant sex offender and soon ran away from home; finally her father had her sentenced to Bedford.

76. (1) Bottle factory. Discharged at the end of 2 years. (2) Domestic. Left to marry at 17. The man was "no good," but she was pregnant and thought she had better marry him. The child died in a home when a few months old. She tried to live at home, but her father was bitter over her marriage, so she went to live with another man. She had a second child by her husband and one by the second consort. He abused her, so she left him after 5 years. In 2 weeks she was living with another man and had one child by him. She had gone out leaving the baby alone for such long periods of time that the neighbors complained and she was arrested for endangering the life of minor children. The little baby was in a room with only straw to sleep on and without food.

89. (1) Worked in a candy factory. Was laid off in the slack season. (2) Worked in a moving picture place as cashier until it was closed for repairs and then (3) painted glass pearl pictures. She quarreled with the manager and was discharged. She was unable to get work and her family were impatient with her. She was a sex offender while working in the moving picture establishment. Her people had always been strict with her and she had to be in by 9 o'clock. A short time ago she and another girl went driving with two Italians and did not get in until 11 o'clock. Her father was so angry that she became afraid and ran away. He then took her before the Children's Court. She was paroled at the end of 2 months to be married to the father of her child. The mother had not known that she had been immoral until after her arrest. After 3 months she and her husband got to quarreling; they separated, and her people sentenced her to the Reformatory because she had broken her parole.

93. She helped her grandparents with the housework for 3 years after leaving school. When she was 18 her grandmother died and she (1) went to work in a department store for $5.00 a week. She left after a year because the salary was too small. A girl in the store had told her about soliciting and how much money there was in it, so she went on the streets.

103. (1) Folded and pasted covers. Was discharged after 5 months. (2) Feather steaming factory. Was laid off after 4 months. (3) Printing establishment. Laid off after 6 months. (4) Folding and pasting. Laid off after 4 months. (5) Box factory. Laid off after 3 months. Held other jobs, she thinks, but was always laid off. A year ago she was a sex offender

and her mother put her in the Florence Crittenden Home for 5 days. She ran away, but was found and sentenced to Bedford as a common prostitute. Her sister was here when she was committed.

111. (1) Domestic for 3 years in a doctor's family. She left to earn more money. (2) Worked in a very good hotel for 5½ years. Began to drink. Met and married a very good man, but she drank so hard that he finally sentenced her to the Reformatory. She has been paroled to her husband and is doing nicely so far.

*Seventh-Grade Group.*

12. (1) Domestic for 2 years. Left because her mother was ill. After being home for a year (2) was a domestic. Left because family moved away. (3) Domestic. Left after 8 months because she wanted to go to Poughkeepsie with friends. (4) Caretaker to an invalid. Left because she was not needed any more. (5) Domestic for 6 months. Left because she wanted to go back to Poughkeepsie. (7) Worked in a boarding house. Left because work was too hard. (8) Waitress in a home for the deaf. Left after 5 months because too far out in the country. (9) Went to Poughkeepsie to live with a girl and held one more job as domestic for a short time. Stayed out late nights and was arrested and sentenced to Bedford. Has been immoral since she was 18 years of age.

14. (1) Cigarette factory. After a year was a sex offender and from that time on went on the streets. A year later was arrested for soliciting. Supported a man by prostitution. Was out on probation to Miss Smith. Her family are very respectable Italians.

26. (856) (1) Machine operator for 6 months in Scotland. Left to come to America. (2) House work for a little over a year. Shortly after coming to America she met an Italian whom she has since supported by prostitution. Was arrested for stealing a watch when 16 and sentenced to Bedford. She broke her parole to go back to her Italian "lover." She was found and returned to the Institution to finish her parole. Upon her discharge she returned to the Italian and continued to support him by prostitution until her rearrest on February 15, 1913. She is still fond of this Italian and will doubtless go back to him upon her discharge.

31. After parents' death lived with an Aunt and did nothing until the insurance money ($500) was spent. Then (1) worked for 6 months as a domestic. Left to work with Aunt in millinery business. (2) Aunt tried to keep boarding house and the girl helped. Was first a sex offender at 22. The man was an Italian and since the birth of her baby she has not worked. She has had a second illegitimate child. Arrested for keeping a disorderly house in White Plains.

32. (1) Pocketbook-case factory for 3 months. Stopped on account of the hot weather. (2) Pocketbook-case factory again in the fall for 3 months. Left because her mother thought she was not strong enough for the work. (3) Made lace collars at home intermittently for the next 2 years. A sex offender first at 16 with the landlord's son. After her parents' death, because her uncle refused to support her and expected her to help to earn her own living, she went to live with a gambler. He deserted her 2 years ago. Lived with her sister, No. 31, and kept a house of prostitution.

52. (1) Worked as bookbinder in bookbinding establishment. After 78 weeks left to be married. Left her husband after 2 years because of his bad habits. (2) She went back to her work in the bookbindery where she worked steadily and supported her child until 4 years ago, when she got in with bad company and took to drinking. She has lived by prostitution ever since, earning from $15 to $18 a week. Was arrested for soliciting.

66. (1) Stock girl for 2 years, then promoted to saleslady. (2) After a year left to be saleslady elsewhere for better pay. (3) Left to be checker in Auto House for 4 months. She was a sex offender first at 19 years of age with a "lover." After 4 years they quarreled and she has been supporting another man by prostitution. She earns about $20 a week. Was arrested as a common prostitute.

67. (1) Worked intermittenly in a jewelry factory with her father. Earned no wages until 17. (2) Was then a telephone operator for 2 years. She married after 5 years. She quarreled with her husband and left him. Has been soliciting ever since, making about $50 a week. Has been sent to the Workhouse once.

69. (1) Clerical work. Her friends persuaded her not to work. First a sex offender at 16 years of age, and shortly after left home because her mother objected to her late hours. She "went to live with a lover." She did not solicit. Was arrested for vagrancy "in a row at Coney Island."

71. Had been on the stage with her mother intermittently since a child. She was ruined by her stepfather when she was 12. After leaving school (1) went on the stage. Left one show for (2) another because she got a better wage. Was discharged, and one of the actors invited her to live with him as his wife. She did not like him, and after 2 weeks took about $4000 worth of his jewelry and ran away.

72. (1) Housework at $7.00 a month. Left because she did not like the confinement. (2) Huyler's candy factory. Left after 1 year because her friends were laid off. (3) Domestic. Left because she had stolen money for a girl friend. She was arrested and put on probation. She persisted in staying out late. Ran away to live with some man; was found and sentenced to Bedford.

73. (1) Worked in manicuring establishment and earned $10 a week. Left after 1 year to work in a barber's shop where she would get more money. After 2½ years she left to marry a widower with 2 children. After 6 months she grew tired of living with him and went on the streets. She has gone back to him twice for a short time. Has contracted a morphine habit and was arrested as a common prostitute. Has been sentenced to Blackwell's Island twice. Was on probation for 6 months and in the Magdalen Home for one day.

94. Mother died when the girl was six and she was put in the Brooklyn Orphanage. (1) Domestic for 2 months. Left because the work was too hard. (2) In a tile factory for 2½ months. Left because there was a strike and her father took her to New York. (3) Tile factory for 2 months. Left there to live with a man she had met a few weeks before. He left her after a few weeks and she began to solicit. A sailor had her arrested for stealing his money when he was intoxicated. The probability is that it was not she who was guilty of the theft. Had been drinking very hard and her father urged that she be sent to Bedford.

106. (1) Clerk in a small store for a few months. Does not know why she left. (2) Waitress. After a few months she got into bad company. She claims that she has never been a sex offender and that she simply "ran with the gang." She has always been so untruthful that her family could not depend upon her, so they had her sentenced to Bedford.

109. (1) Macy's at $5 a week. After 8 months left and tried working (2) in a cigarette factory where she could earn more, but got into bad company and gave up working. Her mother sentenced her to the House of the Good Shepherd because she had bought goods and charged them to the mistress of another girl. She was put on suspended sentence. She was a sex offender

when 16. After the birth of her baby she ran away from home and lived with "sporting people." She had no money and so forged a check using her aunt's name. She has never taken money for immoral relations. She has syphilis.

117. (1) Office work. Was married at 17. Left her husband after 4 years. Had contracted morphine habit as a result of a doctor's prescription. After leaving her husband lived with a number of other men, but claims not to have solicited. She was arrested, for possessing morphine, as a misdemeanor.

*Eighth-Grade Group.*

16. Left home because she could not get along with her stepmother. Went to live with a sister and helped about the house. Was immoral first when 19 years old. She has been soliciting for 3 years. Was sent to the House of Good Shepherd when about 17. A year ago she was married to a man whom she had known 2 months. They quarreled very shortly and separated. She has been arrested 11 times and has been sentenced twice to the House of the Good Shepherd.

23. Has never worked. Married a year after leaving school. Had two children. She left her husband, who drank, and lived with another man, by whom she has had one child.

33. (1) China factory. Left to help at home. (2) Candy factory. Left to help at home. (3) Cigarette factory. Left to be married. After a year and five months left her husband because she was tired of him, and has been on the streets ever since.

45. (1) Wrapper in Abraham Strauss at $5.00 a week. She left to get more wages as cashier in a moving picture show. After a little she left to go to New York with a "lover." She was a sex offender first at 15. Was found by her mother, who discovered that she had gonorrhoea and that she was beginning a life of prostitution, so she had her sentenced to Bedford.

78. (1) Worked steadily for 7 years and finally left because her father was unkind to her. She had been seduced at 16 by a neighbor much older than herself. She went to Boston and alternated between domestic service at $4.00 a week, prostitution and traveling with a circus. She made $20 a week in the circus and not less than $50 a week in prostitution. When arrested she was in a disorderly house when it was raided.

83. (1) Weaver making from $9 to $11 a week. She was laid off because of slack times. Her mother who was not a good woman left her to fare for herself. She could not get work and got in with girls who were soliciting. She herself solicited for a little while, then convicted herself and asked to be sent to Bedford where she hopes she can reform.

84. (803) Had miscarriage at 16 while in school. Was committed to Bedford in 1908. When paroled she did housework for 2½ years at $12 a month in 3 different places, and was then rearrested and sentenced on second commitment for disorderly conduct.

90. (1) Telephone operator. Left for more wages in (2) cigar factory. Her people are well-to-do and she worked merely for spending money. Was sex offender first at 18. She left home and began to solicit, earning $40 a week. She was arrested and put on probation. While on probation she was again arrested for soliciting and sentenced to Bedford.

95. (904) Was sex offender first at 13 years of age and has been immoral steadily ever since. She was sentenced to Bedford when 17 years old. Was given only a few months of parole. She was paroled home and did housework in her parents' hotel until her parole time was up. She then began to solicit again and was rearrested on a complaint of her mother.

97. (1) Office girl in Macy's. Asked for a raise and did not get it, so left after a year. (2) Cashier in a grocery store. Left because she had to work nights. She stayed home for a year and was then married to an Italian who supported her nicely, but kept her pretty closely at home. She grew tired of the monotony of living in her own home and went on the streets. Has been twice arrested.

100. (1) Was clerk in Macy's. Was a sex offender at 18 with one of the floorwalkers of the store. She was married at 20 and after a year and a half found her husband too quiet, so that she left him and went on the streets. After a year she went back to her husband. After the birth of her child she contracted the morphine habit. Left her husband again after 2 years and began to solicit. She was arrested for soliciting, having been on Blackwell's Island once, and sentenced to Bedford.

125. Father was a heavy drinker and the mother "too strict." When she was 11, mother put her in Catholic Protectory to finish school. In her 12th year she came out and was supposed to be working. Instead she was taking lessons to go on the stage and was a sex offender with the man who was teaching her. Her mother discovered this and she was put in the House of the Good Shepherd for 2 years. After her release she worked just one week, when she ran away and began to solicit. She earned about $50 a week. After a month or so she hated the life of the streets so that she put on men's clothes and went (1) to painting and (2) worked in an automobile factory. She remained only a few months in each and was arrested for masquerading in men's clothes.

129. Her people are respectable, estimable people. She left school at 15 because it was necessary for her to help to support herself. She worked for a few months and ran away with a man whom she had met shortly before. She lived with him until discovered by the police, when she was sent to the Reformatory at Lancaster, Mass., for 18 months, where she behaved so badly that she was transferred to Sherburne Prison. She was paroled after 8 months to her mother. She worked as saleslady for 3 months, when she ran away with a man whom she had met in the store. She then drifted to New York and joined an Italian gang, since which time she has been on the streets soliciting and selling heroin and morphine for the Italian with whom she lived. Members of this gang were involved in the "Nash case" last spring and her "lover" left New York to avoid arrest. She was arrested but discharged. Has been using drugs over a year. Has syphilis badly.

## TABLE 73 M.

### *The College Maids.**

1. Protestant. American born. 17 years, 6 months old. Both parents living. Father a farmer. Brothers, 0. Sisters, 2. Left school at 16 years. 6-B grade (public school) completed. She felt that she would like work better than school. Secured work at Vassar and has been there ever since. During summer she stays at home. Healthy and attractive girl, composed and dignified. Said to be a splendid worker by Miss Barrett.

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*Miss Blanche Barrett, Director of Halls, has entire charge of the employment of the maids at Vassar and superintends the housekeeping in the various dormitories of the college. It was through her courtesy that the coöperation of the maids in these tests was secured. She selected this group of 18. She has taken not a little interest in the maids as individuals, and is confident that the ones that we have examined are self-respecting and thoroughly moral and law-abiding. She considers them all entirely efficient in their work.

2. Protestant. American born. 22 years, 8 months old. Father and mother living. Father a farmer. Brothers, 0. Sisters, 2. Left school (public school) at 14 years, having completed 5-B grade. The mother had been ill, and the girl was out a considerable portion of the time as a result. She secured work at Vassar and has sent almost all of her money home to her mother. She found the position at Vassar through one of her girl friends who had worked there. She likes the work very much. During summer she stays at home to help her mother. Miss Barrett says she is a splendid worker. She is sweet in her manner and self-contained, but dull and not very quick to understand what is required in the tests.

3. Catholic. American born. 21 years, 3 months old. Mother living. Father died 2½ years ago. He worked in a florist shop. Mother stays at home. 3 brothers, 5, 9, and 12 years of age. 4 sisters. One works at Vassar (see No. 5); one is married and the others still in school. Left school at 13 (German Catholic school). 5-B grade completed. She did not like school and wanted to go to work. She secured work directly at Vassar and has been there ever since. During summers remains at Vassar to do matrons' laundry. Miss Barrett says she is one of the most responsible maids on the campus, that she often acts in the capacity of manager of the laundry when the regular manager is not there.

4. Protestant. American born. 27 years, 2 months old. Both parents living. Father's occupation unknown. 3 brothers, 2 of whom are dead. 8 sisters, 3 of whom are dead. She herself is the oldest of the family. Left school (public school) at just 15, having completed 4-B grade. She had entered 5-B, but failed first half-term. Was ill with some nervous trouble. She liked school and did not need to go to work. Her father was willing that she should go to school, but she "just got the idea that she would like to go to work." She came directly to Vassar and has been there ever since. She was told about the work at Vassar by a patron of the college. She was put at laundry work and has remained in this work. Two of her sisters also work at Vassar; one has been there 7 years and the other 4. During the first summer she worked in a private family. During the second summer in the Queens City Underwear factory and she did not like factory work. During the 4 following summers she lived at home, and during the last 5 summers she has done laundry work at a nearby Lake where she has been paid $20 a month and living. She does not send any money home, but saves a certain amount every year. She goes to the maids' club house at Vassar; is studying the mandolin and Arithmetic and English. She is not very quick to comprehend situations, but is an efficient worker, according to Miss Barrett.

5. Catholic. American born. 18 years, 2 months old. Sister to No. 3 (see above). Finished 6-B grade (German Catholic school) at 15 and went into the 7th grade for 3 months. Did not like school. It was hard and she wanted to go to work. Family would have kept her in school, but she wanted to work. She secured work at Vassar immediately upon leaving school and has been there ever since. During summers she remains at the college and helps to house-clean. She gives all her money to her mother, and the mother gives her car-fare and buys her clothes for her. She is a very efficient worker, according to Miss Barrett. She is a pretty little, dark-haired, brown-eyed, stalky, good-natured girl. She tried very hard to do her best in the test, and was fearful that she would not do well enough. She has pleasing, quiet manners.

6. Protestant. American born. 23 years, 9 months old. Parents both living. Father owns his own farm in U— County and raises raspberries and strawberries. Twin brothers, of whom one died in infancy. One sister 8 years old. She went to a country school and left at 15, having finished the highest class. She could not go to high school because it was too far away, and

her father could not afford to let her board in the village. She stayed home for 2 years. About this time a neighbor who had worked at Vassar told her about the college. She applied for a position and was taken as marker in the laundry, where she has remained ever since. Each summer she has gone home, with the exception of the summer before last when she stayed at the college and did dining-room work. Her mother wants her to come home in the summer. She goes to the club house to read and sew. She sends no money home, but is saving some. She earned $3.23 a week for the first 5 years and $4.61 the last year. She is a pretty, fair-haired, self-contained, perfectly normal girl for her age. She has a clear, happy voice, which is well modulated and her enunciation is good. From her appearance at first I thought she might be one of the college girls. Her attitude toward her work is perfectly sensible and she likes work better than she liked school. Miss Barrett says that she is a very efficient maid. She tried very hard in the tests, but it was evident that she was not capable of understanding quickly the more complex ones.

7. Protestant. Born in Norway. 24 years old. Both parents living. Father a carpenter. Number of siblings unknown.† Left school at 14, having finished 8th grade (public school). She left school because it is the custom for girls of her social class in Norway to go to work when they have finished the grades. A friend of hers was a maid in the dormitories at the University of Chicago and through her she came to America. She has been a waitress and doormaid in one of the University dormitories ever since. The maids at Chicago work for 11 months and so have only one month's vacation. She learned English in a remarkably short time. Is extremely efficient, wide-awake, wholesome and intelligent. There can be no question but that she is perfectly normal. She makes all her own clothes, which are in very good taste, and besides sending money home to her mother, is saving a portion of her salary for herself.

8. Catholic. American born. 17 years, 10 months old. Parents born in Germany. Both parents living. Father is a carpenter. He was married once before and had 2 sons by his first marriage. By the second marriage there are 2 daughters, of whom the one we examined is the older by 22 months. (The younger has worked in the laundry at Vassar and is efficient.) She did not like school very well, but her mother insisted that she continue until she had finished the 8th grade. She left at 14. Her mother was anxious to have her go to high school, but she herself was eager to go to work. She did general housework for the first year at $12 a month. She liked it, but her mistress broke up housekeeping. A girl with whom she had gone to school told her about positions at Vassar. She put in her application and has been in the laundry for the past 3 years. She likes the work very much. Has never regretted leaving school and is coming back again next year. The first year she earned $17.50 a month; the second year $18.50 and now $20. The summer before last she went to New Jersey with her first mistress, who paid her fare there and back and gave her a wage of $18.50 a month. The other two summers she stayed at home. She gives all her money to her mother who buys her clothes. She says she likes to have her mother go with her to buy her clothes, because she is a better buyer. She is a clean, pretty, neat, self-contained girl, quite like the best type of small-town, high-school girl. She has a sweet, refined voice and pretty, happy ways. She wears a little diamond engagement ring. She has unusually deft and beautiful hands.

† We overlooked some items in questioning these girls. Unknown in their histories does not mean that they do not know, as for the most part it does in the records of the reformatory women.

9. Protestant. Born in Scotland. 21 years old. Both parents living. Father a machinist. Siblings unknown. She left school at 14, having finished 7-B grade (public school). She liked school, but was anxious to go to work. She came to America and secured work at the University of Chicago through a cousin of hers who was employed there as a waitress. She has remained there ever since, working 11 out of 12 months in the year, and doing her work extremely well. She sends $5 a month home to her people and is saving for herself a small margin of her wages. She likes her work and will probably continue as a waitress in the dormitory until she marries. She is a very attractive girl, and is well liked both by the other maids and the students.

10. Catholic. American born. Father a saloon keeper. 18 years, 8 months old. Both parents living. Mother became insane and was put in an asylum when this girl was 5 years old. The child was put in a Home of the Friendless. She came out at 12 years of age and was sent to live with an aunt. She entered the 5th grade (German Catholic school). She finished the 6th grade and left school at 14 years of age. 2 brothers and 2 sisters. She liked school, but has liked work better. It was not necessary for her to go to work as her aunt was willing for her to remain in school, but she preferred to work. She first was a housemaid for over a year and received $5 a week, answering the telephone and door and waiting upon table. She left this place to go to Vassar because she wished to be with her sister, who had been a maid at the college for 3 years. Her sister has since left to go into factory work. She is very clever with her needle and for this reason likes factory work which she is doing. Miss Barrett says that the girl we examined is also a beautiful seamstress and will probably go with her sister. During the summer she works in the factory with her sister. She is a pretty, responsive, well-balanced girl, who is saving money and hopes some day to be a dressmaker.

11. Protestant. Born in Scotland. 21 years, 11 months old. Parents living. Father's occupation unknown. 1 brother. 1 sister. Left school at 14, having gone through the "supplementary" which is probably equivalent to our 8th grade. She says that it is the custom among girls in her class in Scotland to go to work after finishing this class. She was first a maid in Scotland for 3½ years, earning $3.46 a week and her board. She then came to America because her brother and sister were here. She did housework at $18 a month for 5 months and left this because the man of the house attempted to make improper advances. She then went to New York to stay with her sister. Her brother had worked in Poughkeepsie and through him she came to the college shortly. She has been there 3 years, earning $4.26 a week and her board. Since leaving school she has been idle but 20 weeks in all. During the summer she waits on table in a little summer resort in Connecticut. She has one of the more important positions at Vassar and is thoroughly efficient. She is a pretty, dark-haired girl who carries herself well. She looked very wholesome and healthy. Her cheeks are red and her eyes bright. She has impacted molars and wears glasses. She enunciates well and has a pleasing voice. Her hands were very pretty and she used them well. She is very happy in the work at Vassar and intends to remain. She likes the little summer resort in Connecticut because it is thoroughly respectable and a healthful place to be.

12. Protestant. American born. 23 years, 8 months old. Parents living. Father's occupation unknown. Number of brothers and sisters unknown. Left school at 16, having completed the 6th grade (public school). She liked school, but preferred to go to work. She worked in a shirt shop for a year, did side-filling, where she earned $7 a week at piece work. She left there to come to Vassar, where a friend of hers was employed, because wages were

better. She has been there for 6 years, earning $4.26 a week and living. She is altogether happy in the work and intends to continue. She goes home for the summers. She is a normal, wholesome girl.

13. Protestant. American born. 21 years old Father died 3 years ago. Father was R. R. conductor. 4 brothers, 2 older and 2 younger than herself. 4 sisters, 2 of whom are older and 2 of whom are younger. None of her siblings have gone into the high school. 2 of her sisters were doing housework and are now doing nothing. The older brothers support the mother and family. She left school at 15, having finished the 7th grade, not because she did not like school, but because she was anxious to earn money. She was cash girl in a department store for 2½ years, earning $2.75 a week. She was then a bundler for 6 months at the same wage, and clerk for 2 months at $3.50. She left because she was tired of working in the store and because she heard about the work at Vassar. She did not stop to consider the matter of salary. She worked in the pantry for the first 2 years at Vassar at $4.00 a week and is now dining-room girl. She likes this work much better than clerking, partly because when she was at home she gave her money to her mother, but now she has it for herself. She clerked in the store the first summer that she was at Vassar. Last summer she was at home and this year she goes to ——— as a waitress. She is a slender, well-poised girl, rather more considerate of herself than others. She has perhaps less sense of the value of money than some of the other maids, but is on the whole a sensible and wholesome girl. More efficient than average, according to Miss Barrett.

14. Protestant. American born. 25 years old. Parents both living. Father game-keeper. 1 brother dead. 1 sister. She left school at 15, having completed 2-B (public school). Worked in musical string factory. Came to Vassar 3 years ago. Waitress in same summer hotel for seven years. More efficient than average and very dependable. She is a very serious, rather frail woman who does her work very thoroughly and conscientiously. She is very religious and most puritanical in her attitude toward dancing and card playing.

15. Catholic. American born. 19 years old. Mother died when the girl was 4 years old. Father shoemaker. 1 brother. No sisters. He has not married again. The girl lived with an aunt who was good to her and wanted her to go further in school. She, however, knew that she wanted to go to work, so she left school (Catholic) at 13, having completed 6-A. She obtained a position at Vassar almost at once and has remained ever since, earning $4.15 a week. She has worked each summer at the same resort in Connecticut. She is a rather keen, self-possessed, sensible girl who likes to work. She is saving money against possible illness or ill fortune. She goes to the resort in Connecticut because it is quiet and respectable.

16. Protestant. American born. 16 years, 2 months old. Father a carpenter, not very well, and the girl thought she ought to go to work. She has one sister. Her parents would have preferred that she remain in school. She left after completing 8-A (public school) at 14. She would have graduated had it not been for being back in 8th-grade arithmetic. She secured work at Vassar almost immediately, and sends $4 a month home. Her sister also has worked at Vassar for 3 years. One is pantrymaid, the other chambermaid. Each earns $4.26 a week and they go home for the summer. She is a fair-haired, tall girl, with pretty voice and nice hands. She is altogether unselfconscious and happy in her work. She is the type of working woman that it is a pleasure to meet, because she is so content with her work. Instead of being embarrassed that she is only a maid, she dignifies the thing she is doing.

17. Catholic. American born. 29 years, 5 months old. Father, a farmer, died when she was 2 years old. Parents were both American born. She was an only child. She left school at 14 years of age, having completed 7-B grade (country school). She was obliged to leave school in order to help her mother, for the uncle who had been their support had married and gone away. She did housework for the first winter at $12 a month and did not like it. The second summer she worked at a summer hotel in her home town as waitress and earned $12 a month. She had cousins who live near Poughkeepsie through whom she heard of the positions at Vassar. She put in an application and secured work almost at once as an elevator maid, where she remained for 5 years at $2.70 a week. For 5 months she worked in a telephone office in her home town. After the fifth year at Vassar she stayed on in the telephone office all winter at $12 a month and board because they begged her to remain. During that winter she learned telegraphy. Then she took a position in the telegraph office at $15 in the winter and $20 in the summer with board and room. This she held for 1 year and 5 months, when she was married. She has had no children. Her husband was telegraph operator and they moved to a western city. There the office was short of help for 9 months and she took a position as telegrapher at $57.50 a month. They lived there 3 years. Then her mother was taken ill and she came back to take care of her. The mother was old and afraid to go so far "out west." The illness protracted itself until the husband grew lonely, gave up his position in Kansas and came east to be with her. He then procured work for a R. R. at $60 a month, and after the death of her mother she came to Vassar thinking that after a year she would save enough money to start housekeeping. In the days when she first went to Vassar, the wages were not as high as they are now, which accounts for the fact that she then earned only $2.70 a week. She now earns $16 a month, and if she remains will probably succeed in being promoted to $25 a month. Much more efficient than average.

18. Protestant. American born. 19 years, 10 months old. Both parents living, American born. Father is a wagon painter. He became crippled 5 years ago with rheumatism. Mother is a cook in a wealthy neighboring family. 2 sisters, one married and one in high school. Left school at 18 years of age, having completed 1½ years of high school, because she wanted to save money to take training to become a nurse. She had a cousin at Vassar through whom she secured work. She is glad of the opportunity to work at Vassar and is saving her money. After another year she expects to leave and take her training in a Hospital in New York. It was her school principal who interested her in the project. She earns $3.69 a week at Vassar. She is a slender, rather refined looking girl. Her enunciation is excellent. She is a person without much force, but absolutely normal and sensible, extremely well-mannered and dignified.

19. Protestant. American born. 28 years old. Father dead. She is an only child. Father was a soldier in the army. She was 16 and about to finish the 8th grade when the Philippine war took her father away from home. It was not necessary, but she felt that she ought to go to work. She secured work as bookkeeper in a government post at $25 a month. After a year her salary was raised to $30. She stayed 3 years and was then married. Her husband supported her very nicely, but died after 5 years. They had one little girl. She then took the child and went back to her mother. She secured her former position, again earning $35 a month. After a year her salary was raised to $40 and at the end of the second year to $45 a month. It was a government position and has lately been reorganized, so that the soldiers themselves do the work and paid clerks were dismissed. She then secured work at Vassar, where she has been for 1 year earning $3.69 a week.

Miss Barrett says that she is to have $25 a month next year. She is a quiet, well-poised and dignified young woman. She has a refined voice and is rather fine looking. She still mourns the death of her husband and regrets that she can do so little for her child. She is saving all she can of her wages in order to send the child to school some day. Much above the average in efficiency.

20. Protestant. American born. 22 years old. Both parents living. Father's occupation unknown. 5 brothers, one of whom is dead. No sisters. She left school, having completed the 3d year of high school at 17 years of age, because she was convinced there were other things she would like better to do. She stayed at home for 2 years. Her family felt very badly about her not going on to school. After 2 years at home she taught in a private school for the feeble-minded where there were 10 children. She was paid $25 a month and living. After 14 months, the daughter of the man who maintained this school returned from the Normal and supplanted her. She stayed home a year and then came to Vassar. She wanted to go to the Hudson State Hospital, but her people persuaded her to come to the College instead. She has black hair and much color. She is really an unusually bright girl. She carries herself well, is keen, attractive and mature. On the whole she thinks it would be best for her to go back to school, but her home is in a small town, and her pride won't let her. She thinks she will become a nurse. She enunciates well and has excellent control of language. She is entirely stable and impressed me as being quite as able and intelligent as the average college freshman. She realizes she is capable of doing something better than the work at Vassar and will probably not remain longer than another year.

TABLE 74.

BELOW-GRADE GROUP

| No. of Inmate | Age Yrs. | Age Mos. | Offense | Previous Inst. * Record. Criminal | Previous Inst.* Record Non-criminal |
|---|---|---|---|---|---|
| 38 | 19 | 6 | Indicted and arrested for Grand Larceny; pleaded guilty to Petit Larceny. | | |
| 65 | 20 | 6 | Vagrancy. | | County House.<br>City Hospital. |
| 122 | 20 | | Petit Larceny. | One arrest; probation, broken. | |
| 123 | 16 | 1 | Disorderly Person. | | |
| 124 | 25 | 9 | Common Prostitute. | | |
| 8 | 22 | 10 | Common Prostitute. | Workhouse, 10 days.<br>Workhouse, 5 days.<br>4 finger prints. | |
| 22 | 23 | 8 | Vagrancy. | | |
| 51 | 21 | 11 | Common Prostitute. | Florence [redacted] Crittenden Home, 2 days.<br>Workhouse, 6 mos. | |
| 56 | 27 | 6 | Adultery. | House of Good Shepherd, Troy, 3 mos. | |
| 92 | 17 | 9 | Disorderly Child. | Brooklyn Training School, 8 mos.<br>Wayside Home.<br>Probation. | |
| 101 | 21 | 2 | Common Prostitute. | House of Holy Family, N. Y., 18 mos. | |
| 112 | 22 | 4 | Petit Larceny. | "Mother tried to have her put away at 16." | Day Nursery. |
| 127 | 20 | 3 | Vagrancy. | House of Good Shepherd, 3 mos. | St. Joseph's Home, Brooklyn, 11 yrs.<br>Kings Co. Hospital. |
| 24 | 17 | 11 | Associating with vicious persons. | Raffael Home, Newark, 11 mos.<br>Gerry Soc. Home, 5 mos. | Kings Co. Hospital, 3 mos. |
| 29 | 18 | 3 | Vagrant. Chap. 887, Subdiv. 3, Code of Criminal Procedure. | House of Good Shepherd, 5 mos. | Metropolitan Hosp., 1 mo. |
| 42 | 17 | 5 | Vagrancy. | Albany Shelter, 4 mos. | |
| 87 | 23 | 11 | Prostitution. | House of Good Shepherd, Peekskill. | |
| 102 | 18 | 6 | Common Prostitute. | Blackwell's Island.<br>Probation. | |
| 115 | 18 | 6 | Petit Larceny. | | |
| 20 | 22 | 11 | Common Prostitute. | Arrested 7 times.<br>6 times on Blackwell's Is., 5 to 15 days. | |

*Blank space means there was no institutional record.

TABLE 74—*Continued*

| No. of Inmate | Age Yrs. Mos. | Offense | Previous Inst. Record. Criminal | Previous Inst. Record Non-criminal |
|---|---|---|---|---|
| 53 | 27:9 | Common Prostitute. | Blackwell's Is. twice, 10 days and 30 days. | |
| 81 | 16:4 | Vagrancy (Prostitute). | | |
| 85 | 28:3 | Prostitution. | Catholic Protectory at 11. | |
| 91 | 27:4 | Common Prostitute. | 7 finger prints. Bedford once and discharged. | |
| 104 | 19:2 | Vagrancy. | Says she was with Sisters once in a place like this. | |
| 114 | 16:3 | Vagrancy. Sec. 887, Subdiv. 3 of Code of Criminal Procedure. | Arrested once and held as witness by Gerry Society. | |
| 18 | 24:1 | Common Prostitute. | | |
| 35 | 33 | Common Prostitute. | | |
| 40 | 17:4 | Common Prostitute. | | |
| 44 | 21:6 | Common Prostitute. | | |
| 64 | 22:5 | Common Prostitute. | Workhouse 7 times. 5 finger prints. Discharged once; fined once. | |
| 108 | 18:2 | Vagrancy. | | |
| 116 | 25:2 | Common Prostitute. | One arrest for deserting child. 4 days. | |
| 128 | 25:11 | Petit Larceny. | Blackwell's Island, 6 mos. | Bellevue Hospital, 6 mos. |
| | | V. Grade Group. | | |
| 2 | 18:7 | Vagrancy. | | White Plains Temporary Home from 5 to 10 yrs. of age. St. John's Hospital, Yonkers, for hip joint disease at 3 yrs. of age. At 13 fractured hip and in Hospital 3 mos. |
| 9 | 22:11 | Loitering (Common Prostitute). | House of Good Shepherd, 3 mos. 2 finger prints. | |
| 30 | 22:10 | Disposing of cocaine. | 3 arrests; once sentence suspended; sentence for 1 yr. to Workhouse, 20 days. | |
| 34 | 20:5 | Common Prostitute. | | |
| 36 | 20:4 | Attempting to commit Grand Larceny, 2d degree. | | Dominican Sisters, Sullivan Co., 12 yrs. |

TABLE 74—*Continued*

| No. of Inmate | Age Yrs. | Age Mos. | Offense | Previous Inst. Record. Criminal | Previous Inst. Record Non-criminal |
|---|---|---|---|---|---|
| 39 | 21 | 7 | Common Prostitute. | Arrested on false charge of stealing; discharged.<br>House of Good Shepherd, 2 yrs. | |
| 70 | 23 | | Grand Larceny, 2d degree. | | Confined in N. Y. Foundling Hosp. |
| 74 | 27 | 1 | Common Prostitute. | | |
| 82 | 20 | 1 | Petit Larceny. | | |
| | | | VI. Grade Group. | | |
| 3 | 16 | 2 | Common Prostitute. | House of Holy Family, 1 yr.<br>1 finger print. | |
| 5 | 26 | 6 | Common Prostitute. | House of Mercy, 9 mos.<br>Workhouse, 5 days and 10 days. | |
| 7 | 17 | 9 | Vagrancy. | Hudson Training School, 4 yrs. | White Plains Temp. Home, 17 mos.<br>Eastview Hospital. |
| 10 | 17 | 5 | Burglary, 3d degree. | | White Plains Temp. Home, 6 yrs. |
| 13 | 20 | 2 | Vagrancy. | | |
| 21 | 15 | 10 | Disorderly Child. | | |
| 25 | 20 | 11 | Common Prostitute. | House of Mercy, 1 yr.<br>House of Good Shepherd, 1 yr. | |
| 28 | 26 | 7 | Common Prostitute. | | |
| 55 | 23 | 5 | Common Prostitute. | Waverly House, 30 days.<br>Probation. | |
| 57 | 17 | 2 | Common Prostitute. | House of Good Shepherd, 5 mos.<br>Miss Westcott's Home, 3 wks.<br>Florence Crittenden Home, 6 days. | 1. Neurological Institute. |
| 63 | 19 | 5 | Common Prostitute. | Waverly House, 4 mos. | 2. Belleview Hosp. |
| 76 | 26 | 1 | Endangering health of minor. | | 3. Jefferson Home Kansas Cy. |
| 89 | 17 | 1 | Associating with disorderly persons. | Once before Children's Court. | |
| 93 | 26 | 8 | Common Prostitute. | 2 arrests. Blackwell's Island. | |
| 103 | 18 | 9 | Incorrigible Child. | Florence Crittenden Home, 5 days. | |
| 111 | 30 | | Habitual Drunkard. | St. Ann's Home, Albany, 6 mos. | |

TABLE 74—*Continued*

VII. GRADE GROUP.

| No. of Inmate | Age Yrs. Mos. | Offense | Previous Inst. Record. Criminal | Previous Inst. Record Non-criminal |
|---|---|---|---|---|
| 12 | 19:4 | Vagrancy. | | |
| 14 | 18:4 | Common Prostitute. | 1 arrest; probation. | |
| 26 | 20:3 | Common Prostitute. | Bedford, 3 yrs. | |
| 31 | 27:11 | Keeping Disorderly House. | | Lying in Hosp. for birth of baby. |
| 32 | 27:3 | Keeping Disorderly House. | | |
| 52 | 28:1 | Sec. 1458 Consol. Act. (Counted as C. P.) | 1 arrest; probation. | |
| 66 | 23:4 | Common Prostitute. | | |
| 67 | 25:4 | Common Prostitute. | Workhouse once; sentence 6 mos.; did 2 mos. | |
| 69 | 19:1 | Vagrancy. | | |
| 71 | 17:4 | Grand Larceny, 1st degree. | | |
| 72 | 18:2 | Petit Larceny. | Probation. | |
| 73 | 22:5 | Common Prostitute. | Blackwell's Is. twice. Probation, 6 mos. Magdalen, 1 day. | |
| 94 | 16:10 | Vagrancy. | | Beecher Home, Brooklyn, 5 yrs. |
| 106 | 17:2 | Associating with Disorderly Persons. | | |
| 109 | 18:7 | Grand Larceny, 2d degree. | Suspended sentence, May, 1912. House of Good Shepherd, 3 mos. | |
| 117 | 22 | Having Narcotics in Possession as a Misdemeanor. | Suspended sentence; broke probation. | |

TABLE 74 (Continued)

VIII. GRADE GROUP.

| No. of Inmate | Age Yrs. Mos. | Offense | Previous Inst. Record. Criminal | Previous Inst. Record Non-criminal |
|---|---|---|---|---|
| 16 | 23:10 | Common Prostitute. | Arrested 11 times.<br>7 times fined $10.<br>4 times, Blackwell's Is., 5–30 days.<br>2 times House of Good Shepherd, 5 wks. and 6 wks. | |
| 23 | 28:5 | Common Prostitute. | | Brooklyn Industrial School, 4 yrs.<br>Brooklyn Training School, 2 yrs. |
| 33 | 21:8 | Common Prostitute. | Catholic Protectory, 5 mos. | |
| 45 | 16:6 | Vagrancy. | | |
| 78 | 23:3 | Common Prostitute (Vagrancy). | | |
| 83 | 17:1 | Vagrancy. | | |
| 84 | 28:1 | Disorderly Conduct. | Bedford, 3 yrs. | |
| 90 | 19:3 | Prostitution. | Probation once which she broke. | |
| 95 | 20:5 | Vagrancy. | Bedford, 3 yrs. | |
| 97 | 25:11 | Common Prostitute. | 2 arrests Blackwell's Island. | |
| 100 | 24:7 | Common Prostitute. | Blackwell's Is. once. | |
| 125 | 17:8 | Vagrancy. | Catholic Protectory, 11 mos.<br>House of Good Shepherd, 2 yrs. | |
| 129 | 22:8 | Common Prostitute. | Lancaster Reformatory, Mass., 18 mos.<br>Transferred to Sherburne Prison, 8 mos., twice discharged. | |

## TABLE 75.

BELOW-GRADE GROUP.

| No. of Inmate | Father's Occupation | Mother's Occupation | Inmate's Age When | | Inmate's Age When | | Number Siblings | |
|---|---|---|---|---|---|---|---|---|
| | | | Father Died | Mother Died | Mother Remarried | Father Remarried | Bros. | Sisters |
| 38 | Coal yard. | None. | | 9 | | | 2 | 1 |
| 65 | Water Supply Section Boss. | Shirt ironer. | 13 | | | | 4 | 4 |
| 122 | Presser. | None. | | | | | 3 | 2 |
| 123 | Foreman R. R. Gang. | None. | 2 | | X | | | 3 own<br>3 half |
| 124 | Farm helper. | None. | 17 | 23 | | | | (1)* |
| 8 | Quarryman. | None. | | | | | 2 | 4 |
| 22 | Farms small farm. | None. | | | | | 1 | (1) |
| 51 | Shoemaker. | None. | | | | | 1 | 2 |
| 56 | Carpenter. | None. | | 6 | | | 1 | 3 |
| 92 | Colors paper in factory. | None. | | | | | 4 (2) | 2 (1) |
| 101 | Street cleaner. | Own; none.<br>Step; sewing and artificial flowers. | | 3 | | X | 1 own<br>2 half | 1 own<br>2 half |
| 112 | Asst. Foreman in feed store. | Housekeeper. | | | | | 1 | 4 |
| 127 | Peddler. | None. | 2 | 3 | | | 1 | 11 (9) |
| 24 | Painter. | Lace maker. | 9 | | | | 1 | 5 |
| 29 | None; supported by mother.<br>Step; chauffeur. | Day's work. | 3 | | X | | 1 own<br>1 half | 2 own<br>1 half |
| 42 | Farm laborer. | None. | | | | | 6 | 5 |
| 87 | Day's work; wigmaker and gambler. | Wigmaker. | | | | | 3 | (1) |
| 102 | Iron railer. | Hat maker. | 3 | | | | 2(dead) | 1 |
| 115 | Step; butcher farm hand. | None. | 1 | | 2 | | 1 own<br>7 half | |
| 20 | Fur cutter. | None. | | | | | 2 | |
| 53 | Own; laborer and express driver.<br>Step; express driver. | None. | 16 | | X | | 4 | |
| 81 | Driver. | Day's work. | 11 | | | | | 1 |
| 85 | Bricklayer. | X. | | | | | 1 | 1 |
| 91 | Own; driver.<br>Step; X. | Laundress. | 7 | | X | | 1 own<br>4 half | 1 own<br>3 half |
| 104 | X | X. | bef. birth | 14 | | | | 4 |
| 114 | Baker. | Factory. | 10 | | | | 1 | 4 |
| 18 | Baker. | Shirtmaker. | 14 | 5 | | X | 2 own<br>3 half | |
| 35 | R. R. rod gang worker. | Day's work. | 18 | | | | 2 | 2 |
| 40 | Driver. | None. | 9 | 12 | | | 5 | 4 |
| 44 | Factory hand. | Day's work. | | | | | 1 | 5 |
| 64 | Farmer (owned small farm). | None. | 2 | 2 | | | | 1 |
| 108 | Farm hand. | Farm hand. | 8 | | X | | 4 own<br>(3) | 3own(2)<br>1 step |
| 116 | Farm laborer. | None. | | | | | 1 | 2 |
| 128 | Traveling salesman. | None. | 1 mo. | 5 | | | | |

*Number of siblings includes those dead; the number not living is repeated in paranthese.

TABLE 75 (Continued)

VTH-GRADE GROUP.

| No. of Inmate | Father's Occupation | Mother's Occupation | Inmate's Age When | | Inmate's Age When | | Number Siblings | |
|---|---|---|---|---|---|---|---|---|
| | | | Father Died | Mother Died | Mother Remarried | Father Remarried | Bros. | Sisters |
| 2 | Insane last 20 yrs. Was blacksmith. | Day's work. | | | | | 3 (1) | 2 |
| 9 | Millwright. Step; carpenter. | Practical nurse at home. | X | | X | | 2 | |
| 30 | Physician. | None. | | 9 | | 15:8 | 1 | 1 own 1 step |
| 34 | Master plumber. | Silk mill. | | | | | 5 | 1 |
| 36 | Laborer in gas house. | None. | 3 | 3 | | | 1 | 1 |
| 39 | Farm laborer. | None. | 1 | 11 | | | 5 | 3 |
| 70 | R. R. engineer. | X. | 10 | 10 | | | | |
| 74 | Painter. | None. | 15 | 2 m. | X | X | | |
| 82 | Carpenter; mechanic; farmer. | None. | 14 | | 15 | | 5 | 4 (1) |

VITH-GRADE GROUP.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 3 | Marble polisher. | None. | | | | | 2 | 3 |
| 5 | Laborer. | Cleans offices. | 21:4 | | | | 1 | |
| 7 | X. | X. | X | X | 2:6* | | | 1 |
| 10 | X. | X. | 3 | 3 | | | | |
| 13 | Carpenter and engineer. | None. | | | | | 6 | 4[a] |
| 21 | Gardener. | Day's work. | | 11 | | | 4 (1) | 4 |
| 25 | Builder. | None. | | | | | | 2 |
| 28 | Farm laborer. | None. | | | | | 5 | 2 |
| 55 | Blacksmith. Step; laborer. | None. | 3 | 5 | 4:6 | | | |
| 57 | Tailor. | Dyeing establishment. | | | | | 2 | 1 |
| 63 | Works for Gas Co. | None. | | X | | | 1 | 2 |
| 76 | Mason. | Day's work. | 22 | | | | 5 (1) | 5 |
| 89 | Painter and decorator. | None. | | | | | 5 (2) | 3 |
| 93 | Cabinet maker. | None. | 5 | 6 | | | | |
| 103 | None (sick). | Clothing factory. | | | | | | 1 |
| 111 | R. R. laborer. | None. | | | | | 5 (1) | 7 (1) |

TABLE 75 (Continued)

VIIth-Grade Group.

| No. of Inmate | Father's Occupation | Mother's Occupation | Inmate's Age When | | Inmate's Age When | | Number Siblings | |
|---|---|---|---|---|---|---|---|---|
| | | | Father Died | Mother Died | Mother Remarried | Father Remarried | Bros. | Sisters |
| 12 | Farm laborer. | None. | 16:4 | 16 | | | 1 | 2 |
| 14 | Bootblack. | None. | | | | | 1 | 2 |
| 26 | Slater. | Janitress. | | | | | 2 | 2 |
| 31 | Master mechanic. | Dressmaker. | 18 | 18 | | | (1) | 1 |
| 32 | Master mechanic. | Dressmaker. | 18 | 18 | | | (1) | 1 |
| 52 | Salesman. | None. | | | | | 2 | 3 |
| 66 | In freight house. | None. | | | | | 1 | 1 |
| 67 | Step; laborer in jewelry factory. | X. | X | | X | | 4 | 3 |
| 69 | Stableman. | None. | | | | | 3 | 1 |
| 71 | Own X. Step; actor. | Actress. | 4 | | 12 | | (1) | 1 |
| 72 | Teamster. | Day's work. | 12 | | X | | 3 | 3 |
| 73 | Fireman. | None. | | | | | 4 | 5 (2) |
| 94 | Steward on tow boat. | None. | | 6:7 | | | 2 | 2 |
| 106 | Hotel keeper. | None. | Sep. | | 10 | 11 | | 3 |
| 109 | Plumber. | None. | | | | | 2 | |
| 117 | Telegraph operator. | Nurse. | | | | | 3 | 2 |

*Foster parent.
[2] Plus five miscarrigaes.

VIIIth-Grade Group.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 16 | Engineer on boats. | None. | 17 | 12 | | 16 | 3 | 5 (1) |
| 23 | Bookkeeper. | None. | 5 | 22 | | | (2) | (1) |
| 33 | Bootblack parlor. | None. | | | | | 7 (2) | 6 (1) |
| 45 | Machinist. | None. | | | | | 3 | 2 |
| 78 | Quarryman. | None. | | | | | 3 | 6 (1) |
| 83 | Plumber. | Boarding house. | | | | | 1 | 1 |
| 84 | Cook on boat. | Restaurant keeper. | 16 | | | | 2 (1) | 4 (1) |
| 90 | Carpenter. | None. | | | | | 1 | (2) |
| 95 | Hotel keeper. | Housekeeper. | | | | | 1 half | |
| 97 | Machinist. | Housework. | | | | | (2) | 1 |
| 100 | Tailor. | None. | | | | | | 1 |
| 125 | Stone cutter. | None. | Sep. 12 | | | | 1 | 2 |
| 129 | Made refrigerators. | Saleswoman. | 8 | | | | | 1 |

TABLE 76.

BELOW-GRADE GROUP.

| No. of Inmate | Nationality | Years in America | Married | No. of Children | | Religion* |
|---|---|---|---|---|---|---|
| | | | | Leg. | Illegitimate | |
| 38 | American | | No | | | P. |
| 65 | American | | No | | 1 | P. |
| 122 | American | | No | | | J. |
| 123 | American | | No | | | C. |
| 124 | German | 9:1 | No | | | C. |
| 8 | Polish | 20:1 | No | | | C. |
| 22 | American | | No | | 1 | P. |
| 51 | American | | Yes | | | C. |
| 56 | American | | No | | 1 (died here) | C. |
| 92 | American | | No | | | P. |
| 101 | American | | Yes | | 1 (died) | C. |
| 112 | American | | Yes | | 1 (died) | C. |
| 127 | American | | No | | 1 | C. |
| 24 | Italian | 14:1 | No | | 1 miscarriage | C. |
| 29 | American | | No | | | C. |
| 42 | American | | No | | | P. |
| 87 | American | | No | | X | C. |
| 102 | American | | No | | 1 (died) | C. |
| 115 | American | | No | | 1 | P. |
| 20 | Russian | 14:1 | Yes | 1 (?) | | J. |
| 53 | American | | Yes | | | P. |
| 81 | American | | Yes | | | P. |
| 85 | American | | No | | | C. |
| 91 | American | | No | | 1 (died) | C. |
| 104 | Polish | 6:2 | No | | | C. |
| 114 | American | | No | | | J. |
| 18 | Austrian | 8:1 | Yes | | 1 (died) | J. |
| 35 | American | | Yes | 2 | | P. |
| 40 | American | | No | | | C. |
| 44 | Italian | 12:3 | Yes | 2 (Both dead) | | C. |
| 64 | Canadian | 7:1 | Yes | | 1 still born | C. |
| 108 | German | 2:2† | No | | | P. |
| 116 | Austrian | 10:2 | Yes | 3 | | C. |
| 128 | Austrian | 11:1 | No | | | J. |

* P = Protestant. C = Catholic. J = Jewish.

†This girl was too dull even to understand the explanation of the tests in her own language so was omitted because of language handicap.

TABLE 76 (Continued)

Vth-Grade Group.

| No. of Inmate | Nationality | Years in America | Married | No. of Children | | Religion |
|---|---|---|---|---|---|---|
| | | | | Leg. | Illegitimate | |
| 2 | American | | No | | | P. |
| 9 | Canadian | 20:2 | No | | | C. |
| 30 | German | 20:2 | Yes | | | C. |
| 34 | American | | No | | | P. |
| 36 | American | | No | | | C. |
| 39 | Irish | 5:4 | No | | 1 | C. |
| 70 | American | | No | | 1 | C. |
| 74 | American | | No | X | X | P. |
| 82 | American | | Yes | 1 (died) | | C. |

VIth-Grade Group.

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | American | | No | | | C. |
| 5 | American | | Yes (?) | | | P. |
| 7 | American | | No | | 1 | P. |
| 10 | American | | No | | | P. |
| 13 | American | | No | | 2 | P. |
| 21 | American | | No | | | C. |
| 25 | American | | No | | 1 miscarriage | P. |
| 28 | American | | X | | X | C. |
| 55 | American | | Yes | 1 | | P. |
| 57 | American | | Yes | | | J. |
| 63 | American | | No | | | P. |
| 76 | American | | Yes | 2 | 2 (one dead) | P. |
| 89 | American | | Yes | | | J. |
| 93 | American | | No | | | P. |
| 103 | American | | No | | | J. |
| 111 | American | | Yes | 2 | | C. |

TABLE 76 (Continued)

VIIth Grade Group.

| No. of Inmate | Nationality | Years in America | Married | No. of Children | | Religion |
|---|---|---|---|---|---|---|
| | | | | Leg. | Illegitimate | |
| 12 | American | | No | | 1 | P. |
| 14 | American | | No | | | C. |
| 26 | Scotch | 6:6 | No | | 1 (miscarriage) | P. |
| 31 | American | | No | | 2 (one died; one premature birth) | P. |
| 32 | American | | No | | | P. |
| 52 | American | | Yes | 1 | | C. |
| 66 | American | | No | | | C. |
| 67 | American | | Yes | 1 | | C. |
| 69 | American | | No | | | P. |
| 71 | American | | No | | | P. |
| 72 | American | | No | | | C. |
| 73 | American | | Yes | | | C. |
| 94 | American | | No | | | P. |
| 106 | American | | No | | | P. |
| 109 | American | | No | | 1 born dead | C. |
| 117 | American | | Yes | 1 | | C. |

VIIIth-Grade Group.

| | | | | | | |
|---|---|---|---|---|---|---|
| 16 | American | | Yes | | | C. |
| 23 | American | | Yes | 2 | 2 | P. |
| 33 | American | | Yes | 1 still born | | C. |
| 45 | American | | No | | | P. |
| 78 | Swedish | 15:1 | No | | | P. |
| 83 | American | | No | | | C. |
| 84 | American | | No | | 1 miscarriage | P. |
| 90 | American | | No | | | P. |
| 95 | American | | No | | 1 | P. |
| 97 | American | | Yes | 1 miscarriage | | P. |
| 100 | American | | Yes | 1 dead | | P. |
| 125 | American | | No | | | C. |
| 129 | American | | Yes | | | C. |

CHART A.*

PREVIOUS HEALTH

| | No. Affected |
|---|---|
| 1. Scarlet Fever | 14 |
| 2. Measles | 51 |
| 3. Smallpox | 2 |
| 4. Diphtheria | 12 |
| 5. Pneumonia | 10 |
| 6. Typhoid Fever | 8 |
| 7. Tonsilitis | 10 |
| 8. Whooping Cough | 15 |
| 9. Rheumatism | 5 |
| 10. Chorea | 3 |
| 11. Convulsions or Faintings | 13 |
| 12. Migraine | 5 |
| 13. Headaches | 10 |
| 14. Enuresis | 3 |
| 15. Abscess | 5 |
| 16. Septic Infection | 1 |
| 17. Cervical Glands | 0 |
| 18. Tubercular and Bone disease | 1 |
| 19. Epistaxis | 1 |
| 20. Ear disease | 7 |
| 21. Eye disease | 7 |
| 22. Eczema | 2 |
| 23. Malaria | 1 |
| 24. Jaundice | 1 |
| 25. Vertigo. Tabes Dorsalis | 0 |
| 26. Injuries—Serious | 5 |
| 27. Suicide—Attempted | 0 |
| 28. Surgical Operations | 17 |
| 29. Laparotomy | 3 |
| 30. Syphilis | 3 |
| 31. Gonorrhoea | 7 |
| 32. Pregnancy | 36 |
| 33. Miscarriage | 8 |
| 34. Alcoholic { Absinthe, Beer, Whiskey, Wine, Gin } | 16 |
| 35. Opium | 4 |
| 36. Cocaine | 1 |
| 37. Tobacco | 10 |
| 38. Tea | 11 |
| 39. Coffee | 11 |

PRESENT PHYSICAL FINDINGS.

*Posture-Nutrition.*

| | |
|---|---|
| 40. Posture bad | 7 |
| 41. Nutrition (a) Excellent condition | 13 |
| (b) Mal nutrition | 4 |
| 42. Obesity | 5 |

* Of the 100 subjects to whom the tests of the Bureau of Vocational Guidance were given 26 were not given the special Physical Examination whose results are tabulated in this and the following chart. These subjects omitted are 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 29, 32, 39, and 129.

*Orthopoedic.*

| | | |
|---|---|---|
| 43. | Spinal Curvature | 9 |
| 44. | Flat Foot | 12 |
| 45. | Bowlegs | 3 |
| 46. | Pigeon Breast | 2 |
| 47. | Prognathism | 2 |
| 48. | Abdominal Ptosis | 9 |

*Stigmatae of Degeneracy.*

| | | | |
|---|---|---|---|
| 49. | Facial Asymmetry | | 11 |
| 50. | Eye | (a) Differing in color | 3 |
| | | (b) Asymmetrical | 1 |
| 51. | Ear | (a) Lobes attached | 17 |
| | | (b) Tubercle | 3 |
| | | (c) Asymmetrical | 2 |
| | | (d) Large or Long | 5 |
| 52. | High Palate | | 9 |
| 53. | Tattoo | | 5 |
| 54. | Bites Nails | | 18 |
| 55. | Thick Lips | | 2 |
| 56. | Deformed Toes | | 1 |
| 57. | Deformed Thumbs | | 2 |
| 58. | Ptosis of Eye Lid | | 1 |
| 59. | Forehead Low | | 4 |
| 60. | Mongolian Type | | 1 |

*Cutaneous.*

| | | |
|---|---|---|
| 61. | Naevus | 4 |
| 62. | Moles | 6 |
| 63. | Spots or Macules | 7 |
| 64. | Eruptions—Papular | 5 |
| 65. | Eczema Capitis | 1 |
| 66. | Acne Vulgaris | 10 |
| 67. | Vaso-motor | 3 |
| 68. | Freckles | 6 |
| 69. | Warts | 1 |
| 70. | Ulcers | 0 |
| 71. | New Growths | 0 |
| 72. | Nails—Deformed | 1 |
| 73. | Sallow | 8 |
| 74. | Scars—Non-surgical | 25 |

*Glandular.*

| | | | |
|---|---|---|---|
| 75. | Thyroid | | 5 |
| 76. | Cervical | | 8 |
| 77. | Mammary | (a) Enlarged | 17 |
| | | (b) Senile | 2 |

*Teeth.*

| | | |
|---|---|---|
| 78. | Spots on Enamel | 2 |
| 79. | Poor | 21 |
| 80. | False | 0 |
| 81. | Deformed | 25 |
| | (a) Irregular | 10 |
| | (b) Long or Large | 10 |
| | (c) Hutchinson | 1 |
| | (d) Furrowed | 1 |
| | (e) Crowded or Impacted | 6 |
| 82. | Pyorrhoea | 1 |

*Mouth and Throat.*

83. Tongue—Coated..... 17
84. Tonsils { (a) Enlarged..... 34 / (b) Absent..... 20
85. Adenoides..... 2
86. Chronic Nasal Catarrh..... 1
87. Nasal Obstruction..... 11

*Lungs.*

88. Suspicious. Tb..... 4
89. Asthmatic Dyspnoea..... 1

*Heart.*

90. Mitral Disease..... 3
91. Pulmonary Valve Disease..... 1
92. Hypertrophy—Simple..... 3
93. Tricuspid Murmur..... 1
94. Tachycardia..... 32
95. Bradycardia..... 8
96. Arrhythmia..... 5
97. Varicose Veins..... 0
98. Anaemia..... 0
99. Vaso-motor—Skin..... 0

*Intestines*

100. Hemorrhoids..... 6
101. Constipation..... 10

*Sense Organs*

102. Vision { (a) Very poor..... 7 / (b) Poor..... 15 / (c) Astigmatic..... 21
103. Hearing { (a) Dull..... 12 / (b) Very dull..... 3
104. Strabismus { (a) Divergent..... 2 / (b) Convergent..... 3

*Genito-Urinary Findings.*

105. Deformity of Clitoris..... 7
106. Hypertrophy of Labia..... 20
107. Urethral Caruncle..... 2
108. Unruptured Hymen..... 4
109. Undeveloped—Infantile..... 5
110. Deformed—Double Vagina..... 0
111. Lacerated Cervix or Perineum or both..... 16
(a) Lacerated Perineum..... 12
(b) Lacerated Cervix..... 10
112. Displaced Uterus..... 14
(a) Antiflexion..... 3
(b) Prolapse..... 8
(c) Retroversion..... 6
113. Fibroma Uteri..... 2
114. Salpingo-vophoritis..... 1
115. Amenorrhoea..... 10
116. Dysmenorrhoea..... 4
117. Irregular Menses..... 3
118. Nocturnal Enuresis..... 1

119. Pelvic organs absent..... 1
120. Cystocele or Rectocele..... 5
(a) Cystocele..... 5
(b) Rectocele..... 2

*Nervous System.*

121. Reflexes—Abnormal..... 11
(a) Pupils..... 1
(b) Knees..... 9
(c) Babinski..... 1
122. Tremors..... 8
123. Epilepsy..... 7
124. Chorea..... 2
125. Speech Defect..... 2
126. Nystagmus..... 1

127. Syphilis
P. Positive reaction..... 31
N. Negative reaction..... 39
D. Doubtful reaction..... 2
X. Not tested..... 2

128. Gonorrhoea
P. Positive reaction..... 38
N. Negative reaction..... 14
D. Doubtful reaction..... 20
X. Not tested..... 2

## CHART B.

PRESENT HEALTH AND PRESENT PHYSICAL FINDINGS.*

Subject

28 —11, 12, 28, 31, 32(1), 74, 75, 77(a), 81a, 84a, 100, 123?, 127P, 128P.
30 —2, 9, 21, 28, 36, 73, 74, 79, 84b, 102a(right), 102b(left), 104divergent, 127P, 128P.
31 —2, 8, 32(2), 34, 51a, 69, 79, 81a, 84a, 94(96), 111a, 127N, 128P.
33 —1, 2, 4, 31, 32(1), 34, 37, 51b, 54, 76, 84b, 101, 102b, 106, 127P, 128P.
34 —2, 4, 7, 11, 30, 34, 42, 48, 81e,.84a, 102b, 102c, 103a, 117, 121b, 127P, 128P.
35 —28, 32(2), 42, 43, 48, 51d, 54, 74, 79, 81b, 93, 94(84), 106, 111ab, 121b, 123, 127P, 128P.
36 —2, 4, 5, 32(1), 33(1), 49, 51a, 51d, 59, 68, 72, 75, 78, 79, 84a, 101, 105, 109, 127N, 128P.
37*—2, 28, 32(3), 33(1), 37, 41b, 62, 68, 74, 78, 84b, 111ab, 112b, 127P, 128P.
38 —2, 7, 8, 43, 44, 46, 51b, 57, 66, 77b, 84a, 94(84), 102c, 105, 108, 109, 127P, 128N.
40 —2, 4, 15, 34, 54, 74, 76, 77a, 81a, 94(100), 102c, 127P, 128P.
42 —2, 41b, 62, 66, 74, 77a, 81b, 83, 84a, 105, 109, 125, 127N, 128N.
44 —2, 32(2), 50a, 84a, 94(88), 106, 127P, 128D.
45 —21, 54, 83, 84a, 94(84), 103a, 107, 127P, 128P.
48*—1, 2, 32(1), 68, 102c, 111a, 112b, 127P, 128P.
50*—1, 7, 29, 30, 32(2), 33(2), 62, 63, 74, 77a, 83, 84a, 94(96), 103a, 109, 112c, 127P, 128D.
51 —2, 5, 34, 37, 66, 79, 80, 84a, 88, 94(88), 96, 100, 112c, 122, 127P, 128P.
52 —2, 32(1), 34, 42, 79, 80, 83, 84a, 94(130), 102c, 122, 127P, 128N.
53 —1, 2, 4, 11, 20, 28, 34, 57, 53, 74, 77a, 79, 83, 89, 94(108), 102c, 106, 112bc, 121a, 122, 123, 127P, 128P.

55 —2, 6, 28, 32(1), 38, 39, 41b, 49, 58, 83, 84b, 102c, 103b, 111b, 120a, 127N, 128P.
56 —1, 2, 8, 11, 20, 32(2), *38*, *39*, 44, 54, 74, 75, 77a, 79, 81a, 84b, 87, 102b, 103b, 104divergent, 123?, 127N, 128N.
57 —2, 13, 21, 26, 34, 37, 38, 41b, 51a, 51c, 77a, 102b, 102c, 127P, 128N.
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* The subjects starred are those who were not included among the Bedford 88 because of language handicap. The other 65 are those of the Bedford 88 to whom special physical examination was given. Following the number of the subject are the diseases attributed to her, listed by the numbers given in Chart A. For instance, to interpret the record of subject 28, by turning to Chart A 11 is found to be convulsions or fainting, 12 to be migraine, 28 to be surgical operations, 31 gonorrhoea, 32 (1) one pregnancy, 74 scars—non-surgical. The italicized numbers indicate excessive use of the drug or stimulant indicated.

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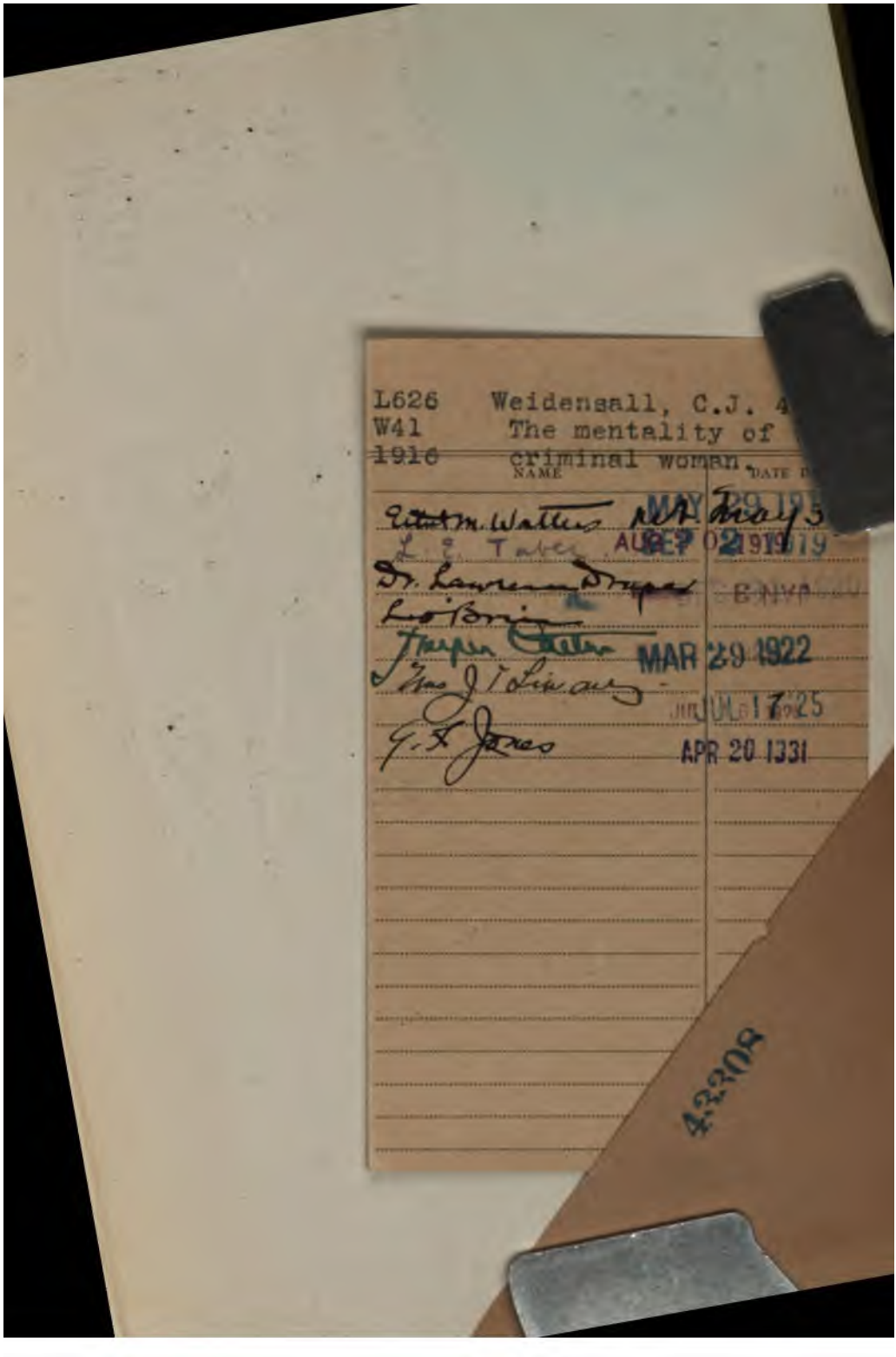
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